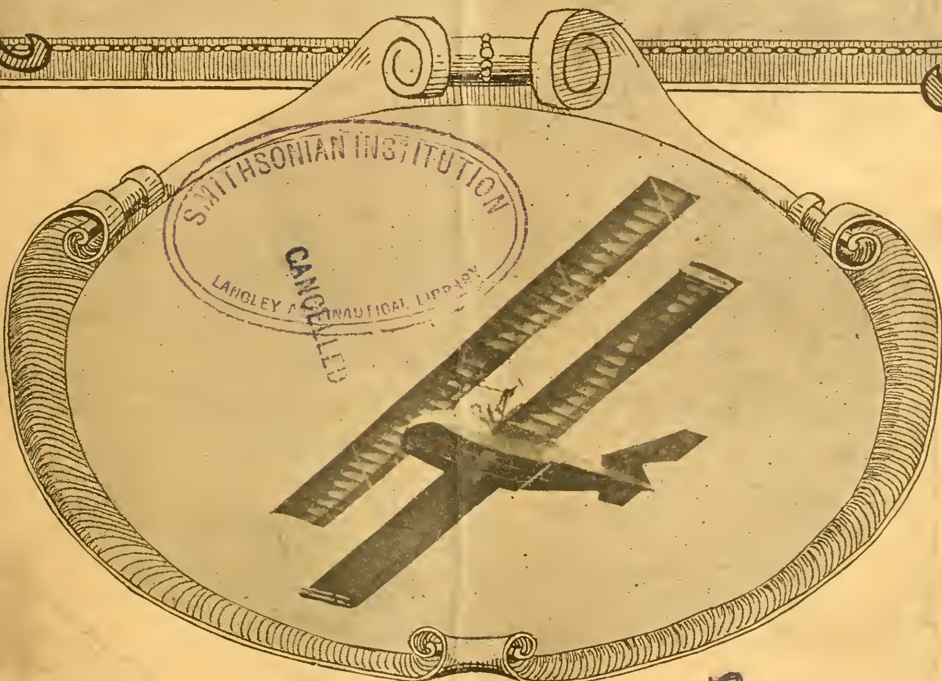
JULY
1-9-1-3

AERONAUTICS



XIII. No. I

THE BENOIST FLYING BOAT

25 Cents


You Can Have
Perfect Ignition
YOU can insure yourself satisfaction and obtain the utmost efficiency from your motor by refusing "some magneto and plugs" and insisting upon the standard, Bosch Magneto and Bosch Plugs. ::
Literature sent on request
Bosch Magneto Company
201 W. 46th STREET :: NEW YORK

Technical Talks

By the Technical Editor

The Fluid Deflector of M. Constantin and its Application to the Aeroplane

I have before me American patent No. 1,065,506 to Louis Constantin, on means for reducing the resistance to the passage of vehicles in fluids. This invention is based on the fact that the streams of fluid deflected laterally by a body in motion preserve their new direction for a certain distance after they are out of contact with the body, and also cause the streams of fluid which they encounter to participate in the deflection.

If a blunt-ended vehicle be provided with a screen of appropriate dimensions (but smaller than the major section of the vehicle), supported at an appropriate distance in front of it, then, the streams of air will be deflected outward so that they will not encounter the vehicle, and the resistance will be that of the screen.

This screen may be a disc, a cone, or two plates, preferably curved, and forming a dihedral angle. Best results are, however, obtained by employing a number of curved

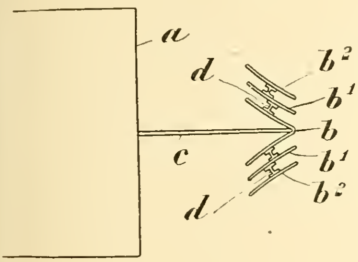


Fig. 1.

plates, arranged as shown in figure 1 deflecting the fluid to both sides, or above and below; or, concentric truncated conical surfaces, as shown in figure 2, deflecting the fluid all

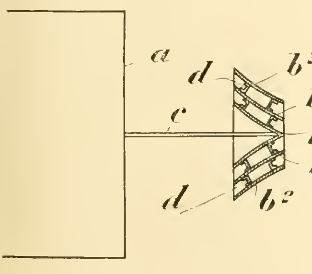


Fig. 2.

around the vehicle. In these figures a is the vehicle, b the plates, and c the support. Where it is desired to deflect the fluid to one side only, a single set of parallel plates can be used.

It is reported that the use of this device on an automobile effected a saving in power of 20% at a speed of 42 kilometres per hour.

Of course we are reminded that a large part of the resistance of a body is stern resistance, which this device probably does not diminish. It is possible that by initiating an inward deflection at the stern, the resistance of that porton could be diminished.

A single curved plate, or several parallel plates, can be employed to shield an observer from the wind. Thus, a deflector placed in front of an aeroplane pilot, will shield his head from the wind, while permitting him to see over the deflection.

M. Constantin has applied the principle of the wind deflector to the aeroplane wing, the object being to increase the rarifaction above the wing by a more energetic upward deviation of the air streams, thus increasing the lift. An account of the results obtained is given in "Aerophile" of June 1st, by M. Henri Mirguet, of which I shall give a short abstract.

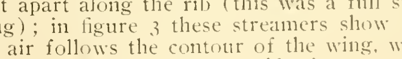


Fig. 3.

Figure 3 shows a section of the "Ponnier" wing which was modified by having its entering edge made concave as shown in figure 4. To show the character of the rarifaction above the wing, streamers were fastened a foot apart along the rib (this was a full sized wing); in figure 3 these streamers show that the air follows the contour of the wing, while in figure 4 they show a rarifaction over the portion a, the first two standing erect with their ends turned toward each other.

Fig. 4.

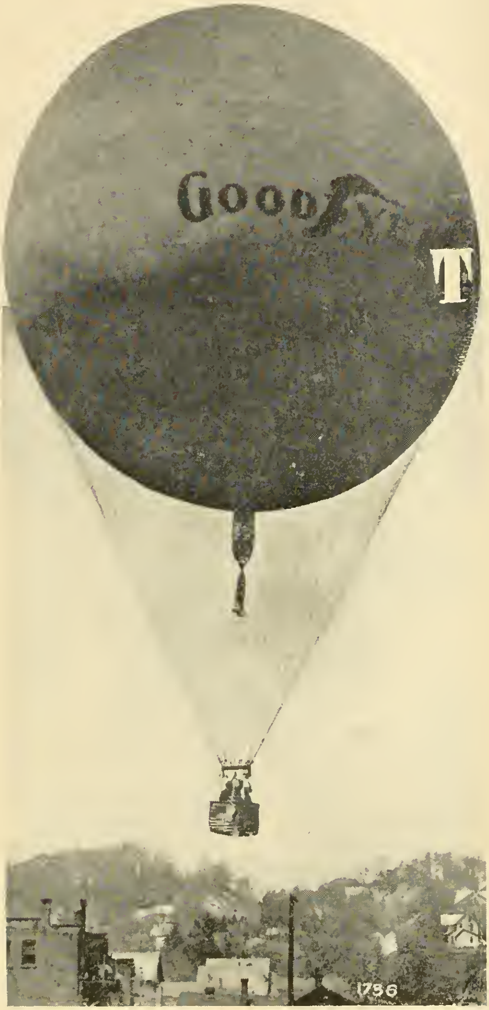
It is inferred that the intensity (and area) of the rarifaction can be increased by employing a series or set of deflecting plates (similar to those referred to above) and the lift still more increased. This, no doubt, can be done, but what effect it will have on the lift-ratio remains to be seen.

As before stated, the wind pressure on this deflecting portion is detrimental, and one

(Continued on page 7)

The Championship Race

By R. A. D. PRESTON



R. A. D. Preston of The Goodyear Tire & Rubber Company, Akron, O., aide in the flight of the balloon "Goodyear," which won the National Championship Race at Kansas City, July 4th, tells the following fascinating story of his experience on the memorable flight:

THE start: We struck a fair equilibrium at about 1,500 feet above ground, and sailed rapidly away to the northeast. A few minutes later we saw the "Kansas City Post," Honeywell's balloon, and the "Kansas City II," John Watts, coming after us. The "Goodyear" continued at approximately original height until after midnight, the other two balloons appearing to be working west of us.

Almost as soon as we were well in the air, over in the north appeared what seemed to be the inevitable thunder shower for this race, and as the night grew on another came up in the east, and we could see more lightning flashes away to the south. At 2:10 A. M. the sharp patter of rain above told us that we were in the storm. In a minute or two the rain was pouring down on the balloon, and in a few seconds more we started downward.

Upson watched the instruments, while the aide hustled inboard the sand bags and other accoutrements we had hung outside the basket. This was to prevent them being torn off if we should drag along the ground. About 2:30 while I was making things fast inside the basket, Upson called to me that our drag rope had touched ground, and to watch out. It poured rain for half an hour or so, and we raced along with the storm, the drag rope hitting the tops of the hills, and once or twice the basket struck the ground, but quickly bounced up again. The lightning helped rather than worried us, as it assisted us in making out the country ahead. We flashed by a windmill and several trees at close range but were not in much danger of striking these as we could see them some distance ahead.

Gradually the storm drew away from us, and it was not long before it was light enough to see the ground pretty clearly. We had crossed the Mississippi during the storm, but where we do not know. Just after the storm an upward air current carried us up into low lying clouds, and for a few minutes we were completely surrounded by the wet mist. As soon as we could we descended to an altitude of five or six hundred feet. As it was nearly dawn, we decided to drag rope, that is,—let the balloon go along at low altitude with the drag-rope trailing along the ground until the sun should expand the gas and carry us up.

We drag-roped for about an hour over the sharply rolling country. The wind would carry us up the slopes without throwing any ballast, sometimes driving us along only a few feet from the ground. In passing over some telegraph wires, the drag-rope tied itself neatly around one of them, and the "Goodyear" hung for a moment securely moored in the air. A strong gust of wind, however, was too much for the wire, and off we started again, the knot on the end of the drag-rope cutting quite a swath through the brush and wire fences, till we finally cut off the offending knot. The sun was just breaking through the clouds to the far east, and we knew that we would shortly be well up in the air. We let the balloon come down a little as we went along in a northeasterly course, and after a repeated hallooing to the farmers below, we finally found at 6:25 A. M. that we were five miles north of Mineral Point, Wis.

There were clouds all about us, but the sky just above was clear. The balloon ascended as the gas heated up—to take readings of speed kept me busy for the next hour, when Upson called my attention to a large city below us, which we knew from the capitol to be Madison, Wis. We were then at 7:40 going due east in fine shape at 42 miles an hour, fast approaching the upper cloud layer, and at 8:20 passed over its edge. The cloud sea was so dazzling white that we were glad to put on the heavily smoked glasses we had obtained for this condition. This cloud sea was wonderfully beautiful, extending almost level for miles around with good sized cloud peaks to the north and south. In a few minutes we could hear the steamer whistles at Milwaukee, and a little later, down through rifts in the clouds were the waters of Lake Michigan. At 10 o'clock we could see the land again, though we did not see either shore of the lake we had crossed. Just before noon we reached our highest elevation of nearly 13,000 feet. Here the balloon shaded us from the sun, and we quickly realized that it was "winter" at this altitude. Before this, while above the clouds, I had been watching the instruments from an improvised paper tent in one end of the basket, as I had lost my sun hat during the storm and the heat while the sun was shining on us, was intense.

Mountainous clouds were piling up above the lever cloud layer to the south, and as this probably meant a thunder shower Upson let the balloon come down slowly to take advantage of the more northerly currents at lower altitudes. At 600 feet, we stopped a little while just above the lower cloud layer which was beginning to break up. The upper cloud layer had disappeared just before we came down. We did not stay long above the lower layer as we could see behind us a big funnel shaped cloud, and the air at this elevation seemed very unstable. Once we ran into a little whirlwind which turned the balloon around rapidly three or four times. It was interesting at this height to look down and see the shadow of the balloon on the clouds below, surrounded by a bright rainbow-like ring.

Descending through the lower cloud layer was very interesting. We did not go into the cloud at all, but seemed to slide down the side of this huge ball of mist with the ground in plain sight just over its edge. We were uncertain as to our whereabouts before descending through this cloud layer, but figured that we were somewhere in the vicinity of Saginaw Bay. Once below the cloud, however, land was visible to the horizon.

The unstable atmospheric conditions were fast using up the gas and ballast, and we realized then that it was only a question of pushing the "Goodyear" as far as we could toward the lake.

The country below was not particularly inviting as with few exceptions it was covered with tall stumps and strewn with dead, broken trees, the cut timber district of Northern Michigan.

By three o'clock our ballast was all gone, and soon our empty sand bags, camp stools, water, milk cans, and most of our provisions were also gone. Reserving a little for landing, we looked ahead for a smooth spot and finally discerned a little spot of fairly smooth ground which we endeavored to reach. We hit a little short of it, narrowly missing a tall dead tree, but bounced up again and succeeded in dropping the balloon directly on a little plot which proved to be a buckwheat patch. Considering the strong wind blowing, Upson made an exceptionally fine landing.

We soon realized now that we had had no sleep and hardly a bite to eat during the race. After a vigorous attack on the remaining provisions, we left the balloon practically as it was and tumbled into bed at the nearest farm house for a good fifteen hours sleep.

After packing up the next day, it developed there was not train south till 2 A. M. Not until we boarded this train, and I picked up a paper in the smoking compartment did we learn that we had won the Balloon Championship of America.

TECHNICAL TALKS

(*continued from page 5*)

would suppose that the loss entailed in deflecting the air upward, would equal the gain due to increased rarifaction. However, an ounce of experiment (properly conducted and rightly interpreted) is worth a pound of argument, and I shall give a brief account of the results obtained, taken from the article above mentioned.

The first test was made in the Eiffel Laboratory by M. Drzewiecki on a wing section which he had previously studied and which was primarily designed to be used as a propeller blade section. "By making the upper entering edge concave the characteristics of the profile were changed as if by magic." The lift was augmented, the drift diminished; and the efficiency (lift ratio) was increased nearly 60% for large angles of attack and 40% for 3°; so that this section most inappropriate for an aeroplane wing, was thereby rendered better than the majority in present use.

A similar test was made by Commandant Dorand on a very thin and good wing section and an improvement (in efficiency?) obtained of 15% for 3°, 26% for 0°, and 55% for 15°, angles of attack. A second test was made by him on a propeller, which showed a marked improvement, though the propeller was already very good, and therefore hard to ameliorate.

Dr. Amans tested wing models of small span and reported an improvement of 95%.

Finally M. Constantin, in collaboration with Commandant Dorand, had ten models tested at the Eiffel Laboratory. One of these was especially good, giving greater lift than the Bleriot XI bis. wing viz. 140% at 0°, 54% at 3°, and 40% at 6°.

A full sized Ponnier aeroplane was tested at Mourmelon. The modification of the wing

(*Continued on page 36*)

The Savary Tractor Biplane

By LEICESTER B. HOLLAND

ONE of the most interesting of the French aeroplanes at the present day is the Savary biplane. Practically unknown in this country; and, until recently, little heard of even in France, it is at present coming into considerable prominence as a weight carrier.

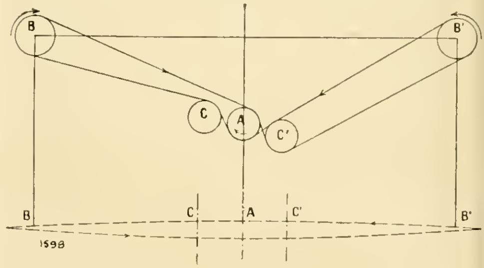
Robert Savary, the builder, became enthused by the first flights of Wilbur Wright at Le Mans and immediately set to work to build for himself. First at Le Mans and then at Chartres he worked steadily away, wasting little energy on advertising or sensational flights, but devoting all his attention to building a machine in which the qualities of efficiency and safety should be pre-eminent. When in 1911, at the military competition at Rheims the Savary biplane swept everything before it, not only carrying by far the greatest useful weight per horsepower, though by its sturdiness of construction the heaviest machine entered, but also showing the best speed of the biplanes, 100 kiloms. an hour on a closed circuit of 5 kilometers, the aviation world began to take notice, and the recent considerable orders for Savary biplanes by the French and Italian governments together with the decoration of M. Savary with the Legion of Honor are evidence that his machines are living up to the promise they then gave.

The latest achievement of note of the Savary machine is the carrying of six passengers by the pilot Frangeois, for an hour and a quarter. The passengers represent a weight of 472 kilos and the useful load carried, including oil and gasolene, totalled 580 kilos. The pilot carried his passengers to a height of 850 metres, thus easily breaking the records for height and duration with such a load.

The main factor sought in the design of the Savary machine is safety. To this end all parts have been made unusually strong; the horizontal members of the tail and the whole framework of the wheels and skid (the skid itself being a heavy T bar of ash) being of steel tubing, while the longitudinal members of the planes and the struts between planes are of ash.

The engine, radiator and tanks are placed in front of the pilot so as to avoid the danger of his being crushed by the motor in a bad landing. This has necessitated putting the propellers in front of the main planes to avoid complications of transmission. Two propellers of 2.5 m. diameter by 1.75 m. pitch, turning in opposite directions at 900 R. P. M. are used. M. Savary is altogether convinced of the superior efficiency of the two chain-driven propellers of large diameter at slow speed over the single propeller connected directly to the motor. To test the matter he built a machine exactly like his regular machines except that it was driven by a single propeller coupled direct to a Gnome engine. He found that the twin screw machine, weighing with its power transmission and passenger 125 kilos more than the single screw machine, flew, nevertheless, at a speed of 26 kilometers an hour greater than the other. Moreover, it is claimed that a twin-screw machine is easier to manipulate than the one single screw type, there being no gyroscopic action; and certainly even the beginners find that it is as easy to turn the Savary to the right as to the left. A third claim for the twin screw is that it provides greater lateral stability which would seem to be true for the Savary, as while responding readily to the action of its ailerons it is very little affected by "choppy" air. Incidentally, the arrangement is a very comfortable one for the pilot, for the two propellers form a pocket of still air just at the "nacelle" so that there is no greater rush of air than that caused by the speed of the machine, and even this is somewhat broken and very pleasantly warmed by passing through the radiator and across the exhausts of the motor before reaching the pilot.

The chief danger connected with the use of two chain-driven propellers, that of the possible rupture of one chain while the other continues to hold, has been cleverly overcome by the use of a single long chain passing over

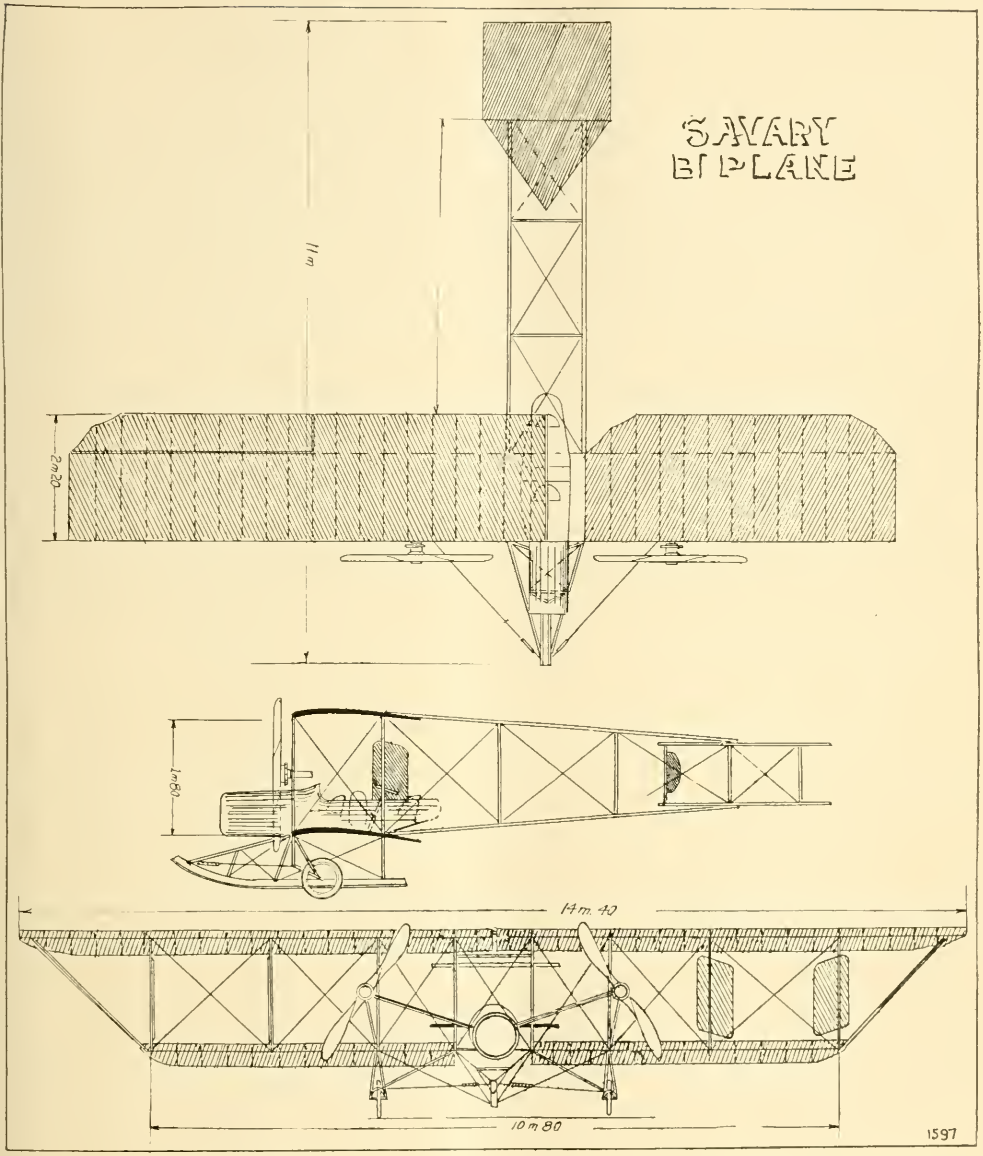


Arrangement of transmission. A, motor sprocket; B and B', propeller sprocket; C and C', idle sprockets.

both the propeller sprockets and the two sprockets on the shaft of the motor and kept in position by two small idler sprockets (see diagram). In this way the crossing of the chain, which is necessary to cause the propellers to turn in opposite directions is made very much more gradual, taking place in the whole length of the chain, instead of in half that distance as in the Wright transmission.

The motor chiefly used is a four cylinder Labor-Aviation, water cooled, developing 70 H. P. at 1300 R. P. M., though in many of the machines a 75 H. P. air cooled Renault motor, turning at 1700 R. P. M. is used instead.

The running gear is also unusual and is perhaps the strongest and most effective in use on any aeroplane to-day. It consists of a single long and very heavy ash skid centrally placed and reaching far in advance of the centre of gravity to prevent "somer-



saulting" in bad landings. This skid is braced by a triangular system of steel tubing forming a truss capable of withstanding the most violent shocks.

The two wheels are suspended by a sort of universal joint from the front longitudinal member of the lower plane. While strongly braced by steel tubing to prevent their tipping sideways, they are free to swing forward and back and also to turn like castors about a vertical axis. Wire guys connect each wheel with the front end of the skid by means of rubber tension springs. These springs hold the wheels normally in a position below the skid but allow them under pressure to swing back and up until the skid rests upon the ground. Another similar rubber spring limits the castor action of the wheels causing them to stand normally straight fore and aft. The wheels are mounted unusually far apart (4 meters), and, being quite independent of each other in their action, make operations on the roughest ground and landing in an inclined position comparatively simple matters.

When stationary the machine rests on the two wheels and the rear end of the skid with the front pointed slightly up, but as soon as it begins to roll on the ground, it assumes a horizontal position being balanced entirely on the wheels with the skid lifted clear. In landing the wheels swing up and the skid,

sliding along almost its full length, brings the machine rapidly to a stop.

Longitudinal stability is assured by a biplane tail joined to the main cell by a quadrangular frame of steel and ash, trussed lengthwise and also crosswise. Each tail plane, of about 4 sq. m., has a fixed non-carrying triangular part in front to insure stability and behind these are hinged the flat, square elevator planes with about 8 sq. m. surface. These planes work both up and down; their large area and their position far in the rear of the main cell make it impossible to "engage" the machine in a rapid descent.

There is no rudder in the tail, M. Savary, thinking that any vertical surface far to the rear of the centre of gravity would give the machine a constant tendency to head up into the wind. Steering is done by four vertical planes or shutters mounted in pairs on the outside rear struts of the cell. To turn to the left, the two left shutters are closed, thus presenting an enormous resistance at this point and causing the right end, where the shutters are left in the stream line, to swing around. The tail being without a rudder swings easily and very short turns can be made at a moderate inclination, while in straight flight the shutters being close to the centre of gravity do not cause the machine to veer from its course.

The upper and lower main planes are built of longitudinal members of ash channelled to shape, and connected at the intersection with the struts by solid ribs of ash of I-beam section. Between these are solid ribs of poplar. The frame work is covered with a heavy linen and varnished with "Novavia." The two planes are 1 m. 80 apart. The upper one has a spread of 14 m. 40 and the lower one of 10 m. 80; both are 2 m. 20 deep. The total carrying surface is 52 square meters. The overhanging portions at the ends of the upper planes are hinged to fold down so that the spread can easily be reduced to 10 m. 80 for storage in the hangars.

Lateral stability is obtained by ailerons hinged to the rear of the upper plane only. These are arranged to work positively both up and down.

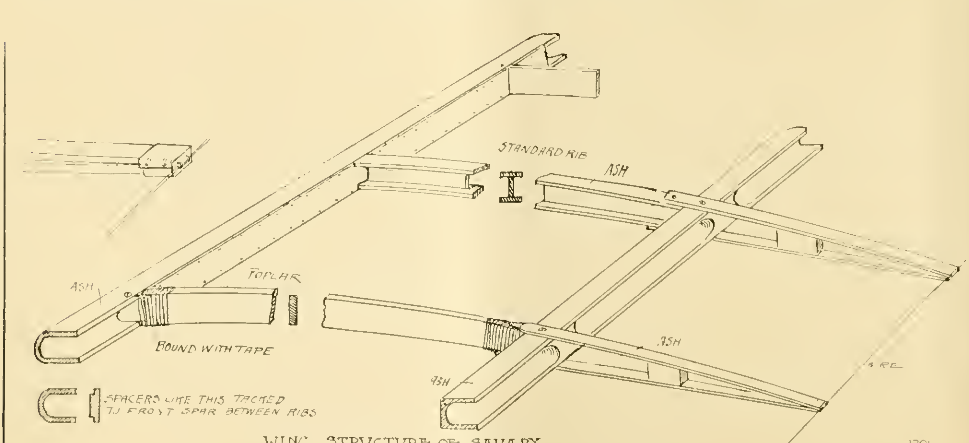
The "nacelle" is built of wood covered with varnished linen. The pilot sits in the rear where he can see behind the lower plane. In front of him is the seat for the passenger and in front of this again, the motor and the radiator. The lower wing is cut away from front to rear for a space of about a foot on either side of the "nacelle" to allow a free view of the ground while the motor group being no wider than the "nacelle" and not descending below the bottom of it cuts off no view at all except when the machine is on the ground.

All three controls are united in a single wheel on a steering post mounted on a universal joint. Steering to right and left is done by turning the wheel as in an automobile. Tipping the post right or left controls the balance, and forward and back, the descent and ascent. All these movements are quite instinctive, and the machine can be easily controlled by either hand alone. The throttle is placed on the wheel and the lever for advancing the spark and the sight feed for the oil on the edge of the "nacelle." The main gasoline tank is situated between the pilot and passenger forming a back for the latter. A glass gauge indicates at a glance the amount of gasoline in the tank.

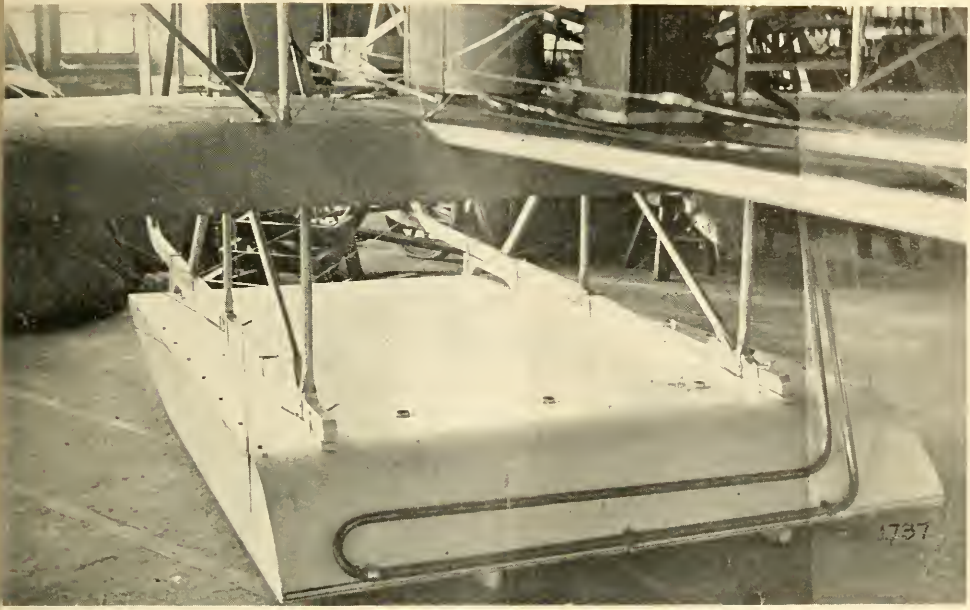
The average speed with two on board is 100 km. an hour, the net weight is 625 kilos, and the carrying capacity is 300 kilos.

The machine with which Frangeois flew on May 8 with six passengers is a specially large one built for weight carrying. In this type, the upper plane has a spread of 19 m. 50; the lower one 14 m. 50. The motor is a 110 H. P. water-cooled Salmson (Canton-Unné) and the nacelle is arranged with two little benches facing each other in front of the pilots seat. The weight unloaded is 700 kilos. Two pairs of twin wheels instead of the ordinary single wheels are used; the two tires of each pair being bound to each other with tape, thus forming a tread about eight inches wide and enabling the machine to land and fly from the heaviest sort of ground.

So easy is it to handle the Savary machine and so efficiently does the landing gear work that two-thirds of the pupils at the school at Chartres obtain their license without having had a single item of breakage.



WING STRUCTURE OF SAVARY



New Model "CH" Wright

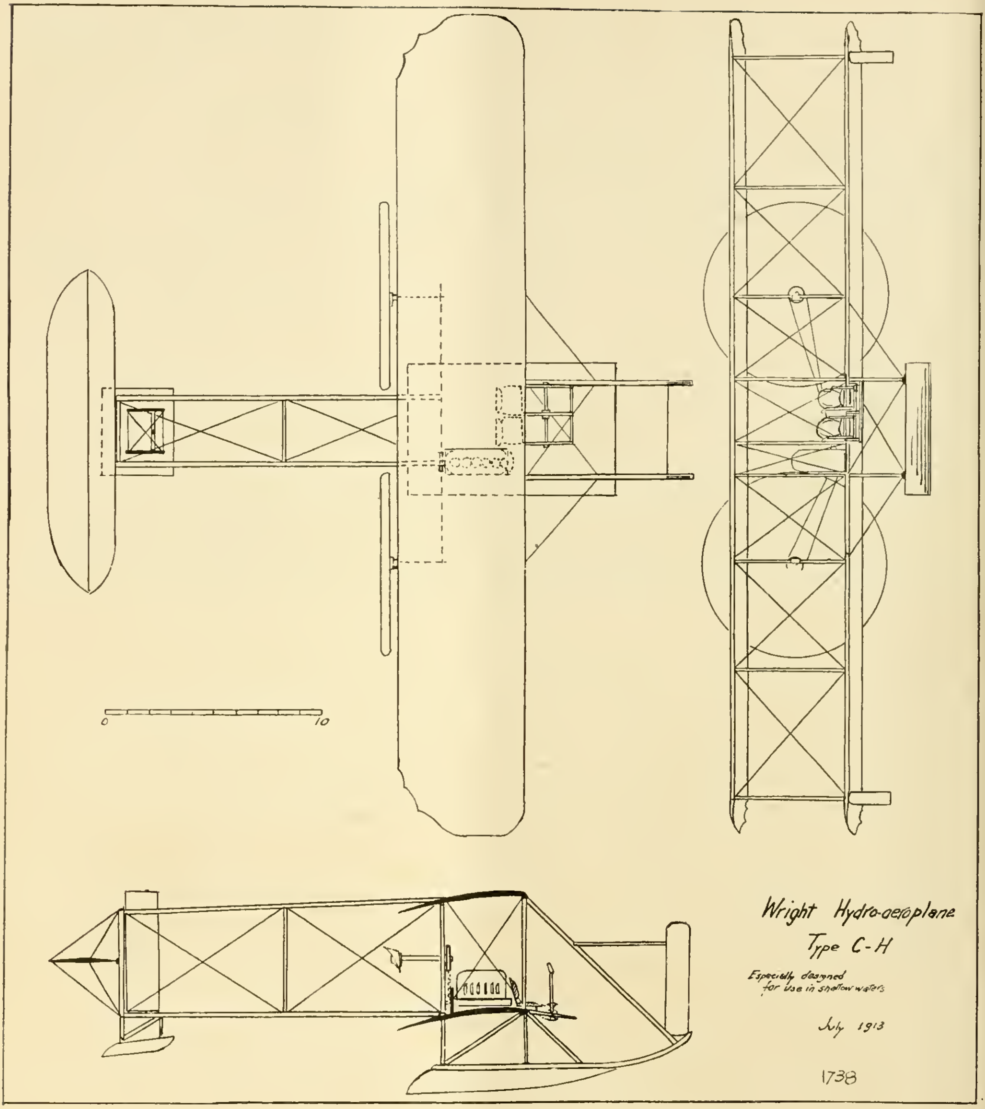
The planes, rudder, motor and drive follow he standard model "C" lines. The span is ;8 feet, chord 6 feet and the surface area is ıbout 440 square feet. The weight empty is ı20 pounds, exclusive of the weight of the entre hydroplane float, which is 240 pounds. One of the new Wright six cylinder, 60 H. P. notors is installed, driving two propellers, 8 eet 6 inches diameter. The machine is fitted vith special instruments recording the angle of incidence with regard to the air currents, etc.

The hydroplane unit consists of a single pontoon, 10 feet long, 6 feet wide and 10 nches deep, and a small pontoon supporting he tail. The form of the pontoon and its position has been determined with great care and a type arrived at that makes the water planing features of this machine unusually efficient.

Mr. Wright has carried passengers on numerous occasions and the best weight lifting performance was when he flew with two of his assistants, Jacobs and Taylor, and Taylor's boy, in addition to considerable amount of fuel, which made a total load on the machine of almost 800 pounds.

The model "CH" rises almost instantly to the top of the water, since it starts and leaves the surface under the expert handling of Mr. Wright, in less than 10 seconds, which is by far the best performance to date in hydroaeroplaning. Mr. Wright has made over one hundred flights with this machine, and on one occasion flew over Dayton, landing on the Miami River at a point between two bridges not over one thousand feet apart, and rose again from this place and flew off over the town to the starting point with perfect ease. During June and the early part of July at his station on the Miami River, Mr. Wright frequently did a large business in carrying passengers, taking up one after another, often despite winds of as high as 10 to 15 miles an hour.

The locality on the Miami River where the tests were held would generally have been considered an almost impossible place for hydro-aeroplaning. The river is very narrow and on both sides are steep banks covered with trees, making flying in any kind of wind an extremely difficult matter. Mr. Wright, however, considers this to represent the average conditions that would have to be met by a machine of this type if it is to have any extended use at all as a means of travel between inland towns, or in opening up inaccessible country over shallow streams. It is particularly for these purposes as distinct from the rough water work that would be met with in larger bodies of water, that Mr. Wright worked out this machine. Its flying qualities have been studied carefully to render it every bit as good as the best land machines, which is distinctly not the case with most other hydroaeroplanes to-day.



I think AERONAUTICS is the best magazine published on the subject of flying and I wish it came every week. I especially like the drawings and descriptions of foreign machines.—C. L. M., Tenn.

I notice, by the way, that men of discrimination and education read AERONAUTICS in preference to the other journals in this field.—C. W. S., Cal.

SANDT DIES FROM INJURIES

Erie, Pa., June 21.—Earl Sandt, aviator, died here from poisoning after the amputation of his leg, necessitated by a fall in his aeroplane at Grove City, Pa., on June 12.

Yes, I still read AERONAUTICS regularly but A.......... and F.......... I find I rarely need to get.—Subscriber.

STANDARD CONTROL FOR NAVY AEROPLANES

All aeroplanes of the U. S. Navy will be fitted with a "universal control" so that any aviator may operate any type or make of machine without learning new controls or endangering life by flying without proper training. It has been found impossible to get any body of men to agree on the merits or demerits of any one of the present systems so Captain W. Irving Chambers is going to arrive at the point by scientific analysis and experiment.

The Martin "Aeroyacht"

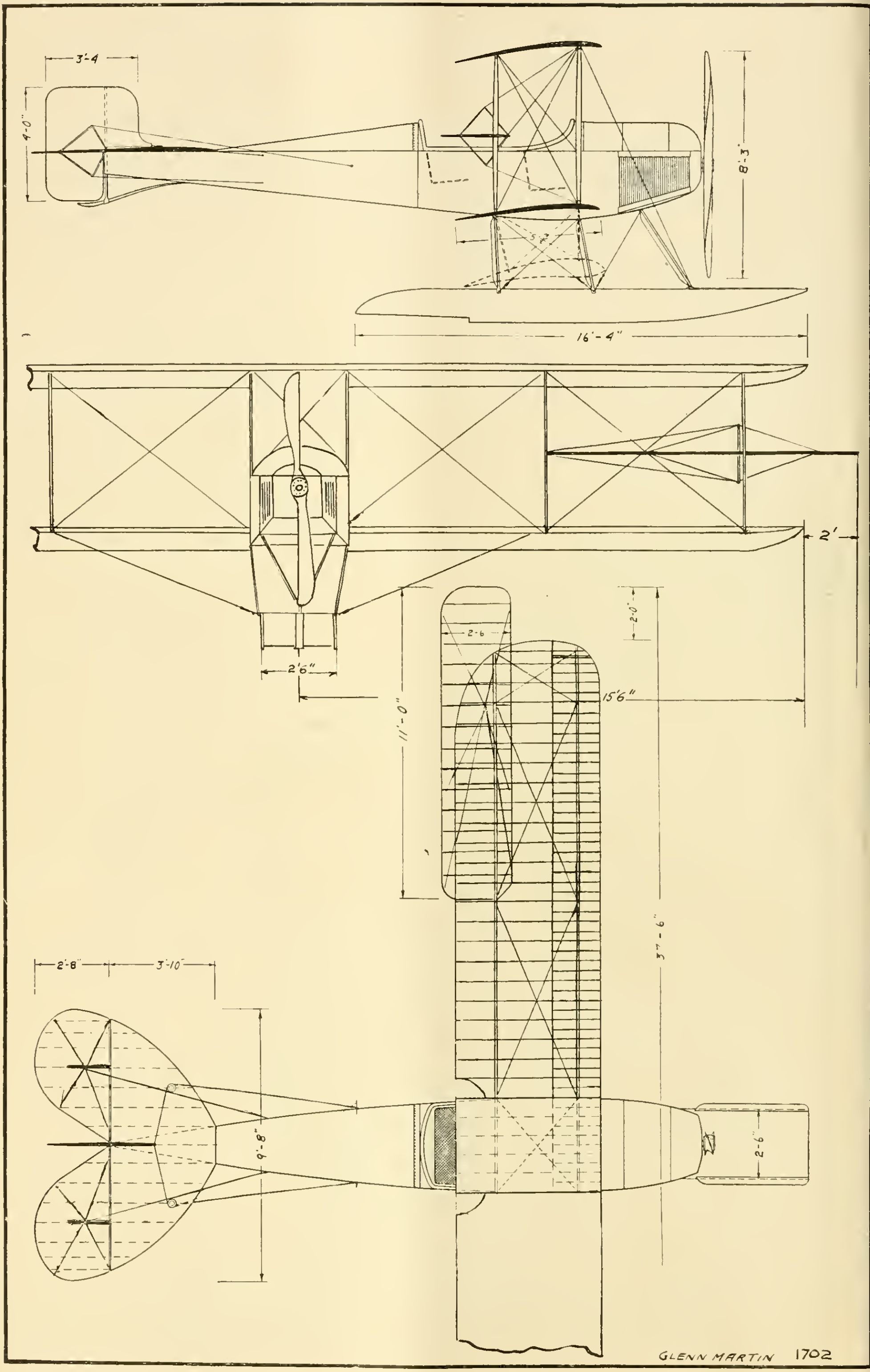
Unique among the new types of aircraft which have been perfected during the last year is the "aeroyacht," designed and built by Glenn L. Martin, the noted California manufacturer of aeroplanes and hydroaeroplanes. The new machine is a four passenger convertible tractor, which combines a maximum of power and efficiency with comfort and safety. The body of the aero yacht is twenty-five feet in length, and being oval in shape, presents a minimum of head resistance while it is in flight. The machine is fitted with two seats of the "surrey" type, each being forty-eight inches wide. The pilot occupies the rear seat with one passenger, the other two passengers occupying the front seat.

The body is mounted on a pontoon seventeen feet in length, which is built up of Spanish cedar planking eight inches wide. Forty sets of rib bracing form the carcass of the pontoon, which is divided into eight water-tight compartments. This method of construction insures the safety of the machine, should the pontoon be damaged while in the water. The outer surface of the pontoon is covered with cloth and glue, and is finished with three coats of varnish. It has a displacement of three thousand pounds.

The main pontoon may be detached from the body of the machine, and replaced with a landing gear in thirty minutes. The landing gear adopted by Mr. Martin is of the two wheel, rubber spring type, and is equipped with a central skid. It is similar in design to the landing gear of the Day tractor, which has proven remarkably strong and efficient during the last year.

The supporting planes of the aero yacht have a spread of thirty-five feet, with a span of seven feet between the struts. The planes are set five and one-half feet apart, and the wings have a camber of three and one-half inches, with a chord of five feet two inches. The wing section is built up, with solid ribs nine inches apart, and short ribs, three inches apart, over the nose. By this construction the

Glenn Martin's "Aeroyacht"



Glenn Martin Hydro

Conover-varnished cloth is held firmly to the designed curve of the plane, and forms a very efficient wing. The front beam is an "I" section two and one-quarter by one and one-half inches, the rear beam being two by one and three-eighth inches.

The wing tip pontoons, which are of a unique design original with Mr. Martin, are of the same mechanical construction as the main pontoon. They are so shaped that at a speed of sixty miles an hour they support their own weight in the air, at the same time presenting practically no head resistance. They engage the water at a planing angle, rendering it impossible to bury a wing under any condition. The smaller pontoons have a displacement of two hundred and twenty-five pounds each.

An 8-cylinder 80 H. P. Curtiss motor furnishes the power, mounted in the forward part of the body, ahead of the pilot and passengers. The motor is enclosed under a detachable aluminum hood, making it easily accessible for adjustment, and is cooled by two specially designed Hall-Scott radiators which have proven extremely efficient. The motor is also equipped with a muffler designed by Mr. Martin, which effectively silences the exhaust but creates no back pressure in the motor.

The fuselage is put together in a simple and efficient manner which makes it unnecessary to drill any holes through the longitudinal members of the body. This is made possible by the metal fittings, which were designed by Charles H. Day, superintendent of the Los Angeles factory of the Glenn L. Martin Co., and fittings of the same type are used connecting the struts and wire to the wing sections. Patents have been applied for on this feature of the machine.

Christofferson Flying Boat

By E. W. HAMMER

Silas Christofferson, the man who flew from the roof of a hotel in Portland, Ore., is now operating a flying boat, equipped with the first of the new Hall-Scott hundreds. The machine carries three passengers at sixty miles an hour and four could be put in without any trouble. It will be interesting to note the flights that are to be made at Lake Tahoe, which is six thousand feet above sea level. Two of these flying boats, with similar motors, are to be supplied to explorer Amundsen.

The upper plane spreads 49 feet; the lower 33 feet 6 inches. Chord 5 feet 6 inches, camber 3.5 inches at 26 inches back, separation 5 feet 5 inches and the total area is 432 square feet. The trailing edge of the upper plane is cut away for propeller clearance but at a point near the ailerons it curves out to 6 feet 5 inches. The main planes have an angle of incidence of 6 degrees. In their construction spruce has been used throughout. The upper is in 3 sections and the lower in two. In the entering edge two strips have been used, the outer being sharply pointed. For the trailing edge a strip of spruce is used with an oval leaving edge. Ribs, of I section, built up are used in main planes, ailerons and elevators. Battens of .25 inches by .5 inches have been used and to give lightness the .25 inch web has been bored out. The web is mortised into the batten, glued and nailed. Oval strips .875 inches by .375 inches run diagonally through the inside of each plane and a number of small tapered strips between the end ribs act as a reinforcement. The main beams are of I section, formed by a web having 3 laminations .75 inch thick mortised into strips 1.375 inches by .375 inches. At the hull the main spars have their greatest thickness, 1.625 inches, tapering down to about 1 inch about half the length of the wing.

Lateral stability is maintained by two ailerons in the top plane, 2.5 feet wide by 6.5 feet., with a reverse camber of .375 inch.

The fixed part of the tail has an area of 24 square feet., maximum spread 9 feet and maximum length fore and aft of 4.75 inches and is set at a negative angle. Spruce I ribs are used as in main planes.

The twin elevators are splayed out to afford room for the rudder. The two elevators spread total 12.5 feet and the total area is 34.33 square feet. In the stabilizer and elevators the forward edges are hollowed out and the ribs set in.

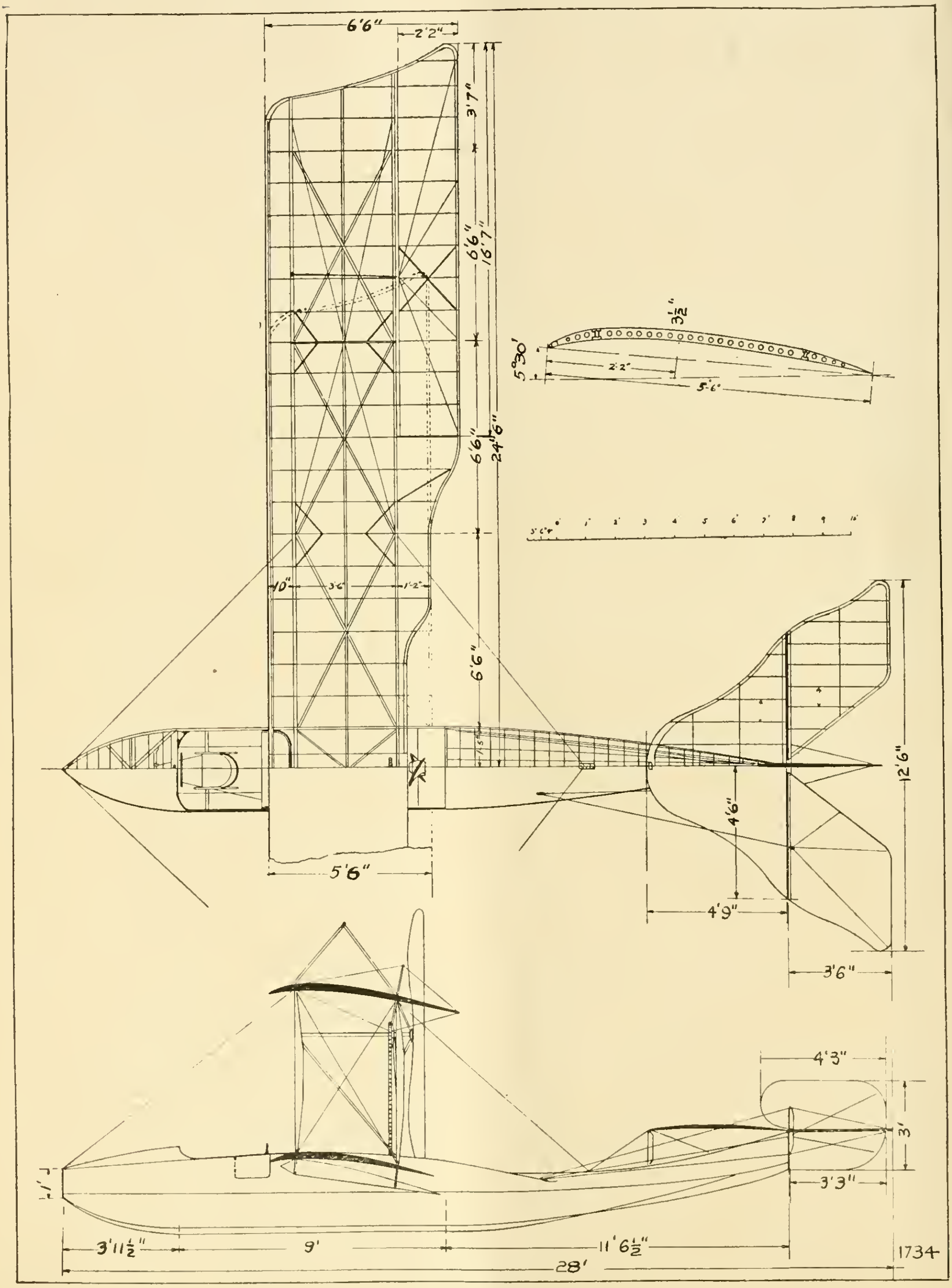
The balanced rudder is 4.25 feet by 3 feet high and has an area of 9.75 square feet. Goodyear fabric is used throughout, and three sizes of Roebling cable. In the turnbuckles chrome nickel steel is used for the ends and Tobin bronze in the centers. The wire ends are all made fast by double ferrules. Cold rolled steel is used for strut sockets and bed rail clamps. All the metal parts are nickel plated. The total weight is 1,200 lbs.

Length of hull from stem to stern is 24.5 feet, the maximum beam is 34 inches and the greatest depth 32 inches; draft is approximately 4 inches. The greatest width and depth are found at a point even with the deepest camber. The maximum beam runs back to a point 12 inches forward of the trailing edge of the lower plane and then rounding off gently flattens out to a wedge at the stern. The hull rounds up 12 inches at the bow and has approximately 9 feet of flat bottom measuring from a line taken at the rear of the hood. The bottom is protected by 2 runners of spruce, having a base of 2 inches and a running surface of 1.5 inches, and 2.5 inches in depth. The runners taper off both fore and aft and are hollowed out in sections. In order to prevent water leaking into the hollow chambers the entire base of the runner is covered with canvas and waterproofed. Hull sheathing is .25 inch cedar on the bottom, .1875 inch to a point 14 inches up the sides, and from here to the gunwale .125 inch cedar has been put on over .25 inch by .5 inch spruce ribs that are reinforced by .5 inch longitudinal spruce

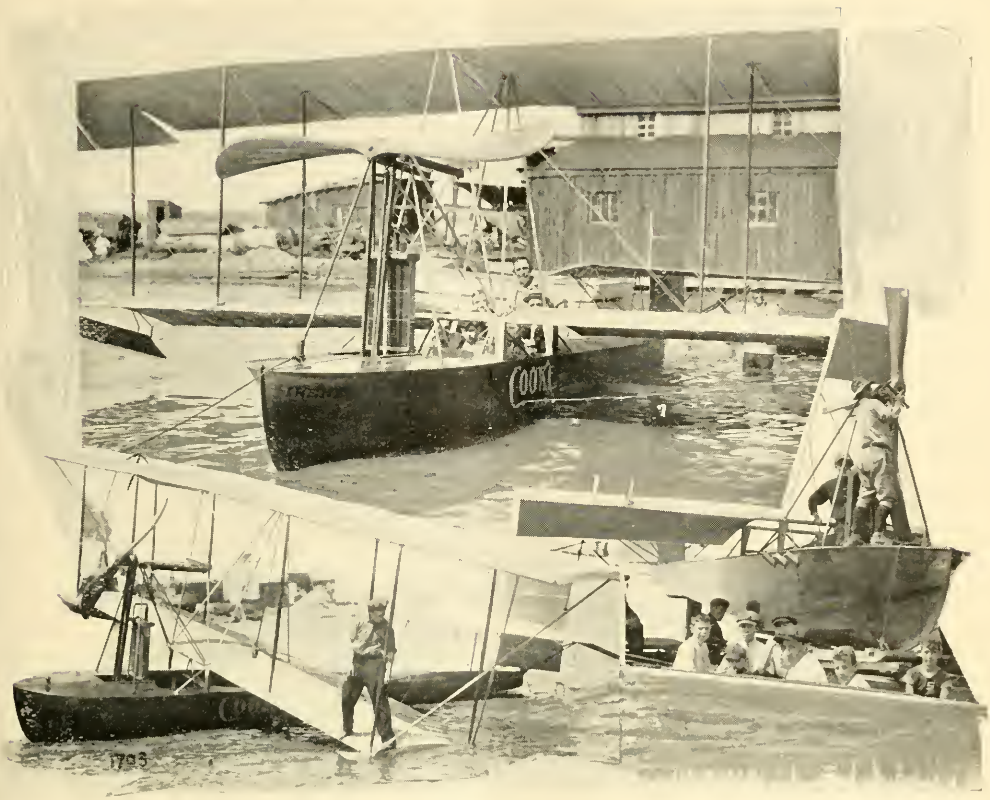
strips. The hood is covered with .125 inch mahogany and runs back to a cockpit that has an opening of 9 feet which furnishes ample room for pilot, passengers, motor and propeller clearance. The balance back of the hull is sheathed with .125 inch cedar.

The 100 H. P. Hall-Scott motor is placed in the rear of the cockpit and is braced by 16 ga. by .25 inch tubing. The motor is geared 18-24 and drives by Diamond chain a Christofferson propeller of 9 feet pitch by 8 feet 5

(*Continued on page 37*)



Christofferson Flying Boat



The Cooke Tractor Airboat

The Weldon B. Cooke Aeroplane Company, of Sandusky, Ohio, has just completed a flying boat of novel design, which, it is claimed, embodies the good features of all its contemporaries. It is a seaworthy-looking design and the motor is in an accessible position. The motor is mounted in the hull just forward of the aviator's seat, and can be very easily reached. A hot bearing, a disconnected wire, a loose nut, can all be discovered and quickly remedied "even while in flight." It is not necessary to climb over the seat or onto the planes to change a spark plug or do any of the hundred and one things an aeroplane motor needs.

The most notable feature of the Cooke airboat is the hull, built by the Davis Boat Works Co. of Sandusky. It is a fine example of the boat builder's art, light, substantial, and graceful. There is not an abrupt line in the hull, with the exception of the step. It is finished in natural wood throughout and a most attractive boat. The materials employed are oak, mahogany, and cedar, all very carefully selected from well-seasoned stock, and thoroughly varnished inside and out, with Valspar. The planking is double, with the inner layer laid diagonally, and oiled gingham between the layers. The sides are two layers of 1/8 inch, the deck one thickness of 1/4 inch, and the bottom forward where the blows strike in hydroplaning, are two layers of 5/16 inch. The planking is riveted every two inches with copper nails, making a hull that will withstand enormous shocks without splitting or springing a leak. The beam is very broad and the freeboard very high, making an excellent boat for rough water. A dive into a wave, except from a height is almost impossible. The Cooke company is the only firm of its kind located on the Great Lakes, and the head of the firm has done a great deal of flying over Lake Erie. The firm is, therefore, well qualified to know what is most important in the design of an airboat for severe conditions. The hull has four water-tight compartments, any one of them large enough to keep the boat afloat in the event of a collision damaging the bottom. The planes are entirely independent of any other part of the boat, and could be cast adrift in a storm without crippling the boat or power plant, and, it would even be possible to drive home under power without the planes.

The boat has a comfortable seating capacity for five persons besides the pilot, in two seats arranged in tandem. The total weight of the machine in flying order is 1,500 pounds, leaving a margin of about 700 pounds for live load.

Dimensions of the hull are as follows: Length, 28 feet; beam, 5 feet; beam (at step), 4 feet; height of step, 8 inches; draught at step, 16 inches; position of step, 11 feet aft; position of C. G., 10 feet aft; freeboard at bow, 3 feet; freeboard at stern, 1 foot; seats, two, in tandem; width of seats, 4 feet. The motor is a Roberts Six, 75 H. P., located in hull, forward, double chain drive to paragon propeller, 10 feet diameter, 10 feet pitch. Motor speed, 1,200 R. P. M. Propeller speed, 600 R. P. M. Gasoline and oil capacity, three hours.

The propeller is mounted in front, on a framework of steel tubing built up from the deck, and is driven at half motor speed by two roller chains running in guides. The propeller shaft is in a direct line with the center of head resistance in the air. The blade is a Paragon, left-hand, 10 feet diameter by 10 feet 2 inches pitch. The propeller shaft is mounted on radial and thrust ball bearings.

The planes are substantial, made up in 7½ foot sections, center sections all double wired, chord 7 feet, gap 7 feet. There are six sections in the top plane and four in the bottom. The top plane spreads 45 feet and the lower 30 feet., the total area being 500 square feet. The wing tip pontoons are flat on the bottom side and have a displacement of 200 pounds each. The two ailerons, of 19 square feet each, are hinged to the rear beam of the top outside section, are interconnected and work both ways. The tail is the conventional fixed stabilizer of 40 square feet surface. There are two elevators of 25 square feet each and a rudder of 19 square feet. There is no vertical fin.

The operation of the control is similar to the Benoist, right-hand lever for lateral and longitudinal control, and left-hand lever for rudder. The trials of the boat have not yet taken place, but the builders expect to put it through its paces in the near future.

BRITISH MOTOR COMPETITION

The British War Office will hold a naval and military aeroplane engine competition to begin on February 1, 1914, at the Royal Aircraft Factory, Farnborough, Hampshire, 33 miles from London. A prize of £5,000 ($24,332) will be awarded to the maker of the engine which, in the opinion of the judges, best fulfills the requirements of the competition and which is entirely suited for the aeroplane service. Although only engines of British manufacture will be allowed in the competition, a statement of what will be required to permit of an entry and also of the attributes which are considered desirable in an aeroplane engine may be of interest to American manufacturers.

SPECIFIED REQUIREMENTS.

Horsepower: Ninety to two hundred.

Number of cylinders: More than four.

Gross weight per horsepower: Calculated for six hours' run, not to exceed 11 pounds.

Shape of engine: Suitable for fitting in an aeroplane.

Origin of engine: British manufacture throughout.

DESIRABLE ATTRIBUTES.

Light total weight; economy of consumption; absence of vibration; smooth running, whether in normal or inclined position and whether at full power or throttled down; slow running under light loads; workmanship; silence; absence of deterioration after tests; simplicity of construction; suitable shape to minimize head resistance; precautions against accidental stoppage, *e. g.*, dual ignition; adaptable for starting otherwise than by propeller swinging; accessibility of parts; freedom from risk of fire; absence of smoke or of ejections of oil or petrol (gasoline); convenience of fitting in aeroplane; relative invulnerability to small-arm projectiles; economy (in bulk, weight, and number) of minimum spare-part equipment; excellence of material; reasonable price; satisfactory running under climatic variations of temperature.

The engines will be submitted to the following tests:

Two runs of six hours each, at full power or throttled down, as desired by the judges. Engines to be placed in inclined positions not exceeding 15 degrees for short special runs. The consumption of fuel and lubricant will be measured. Engines to be dismantled by the competitors' mechanics between the runs if desired by the competitors or the judges, but no work of any kind to be done on an engine except under observation.

At any period during the competition the judges may impose such other tests as they desire, including runs of longer duration, in order to bring out the relative merits of competing engines.

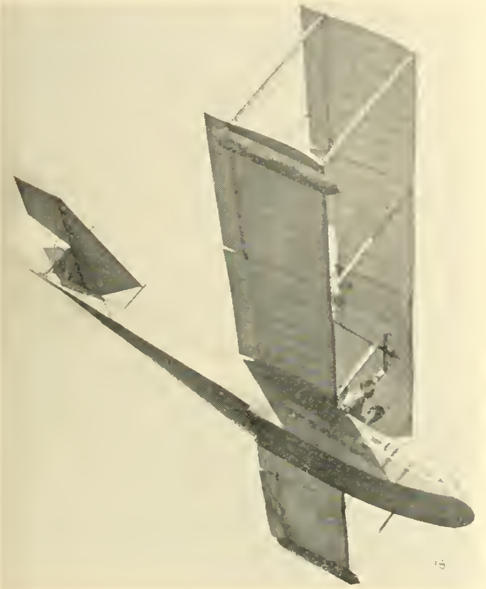
OPENING FOR AMERICAN MANUFACTURERS

The most satisfactory way to secure a market for American aero engines in the United Kingdom would be by direct representation in this country and by using every opportunity for making demonstrations. An excellent opportunity exists at present for the establishment of an English market for American aero engines provided their efficiency can be absolutely demonstrated. Nothing should be left undone to interest the British Admiralty and War Office, and manufacturers of aerial craft of every description, as well as professional aviators. Moreover, a definite and persistent course of advertising would produce satisfactory results to the manufacturer. —From the *U. S. Consular Report.* The Gyro motor has already gone to England and is demonstrating the Gyro in flight.

New Developments in Aeronautics

LATEST BENOIST BOAT

The illustration shows the new Benoist flying boat, "Lakes Cruise" model. This machine will carry two passengers besides the aviator with ease and makes about 70 miles an hour. Its dimensions are as follows:



Spread 35 feet; fore and aft, over all, 23 feet; chord 5 feet; gap 6 feet; width 36 inches; depth of boat at the step 30 inches. The propeller is driven by sprocket and chain with engine installed in the boat as is common with the Benoist machines.

STREAM-LINE FLOW UNDER AIRBOAT HULLS

In one airboat of recent date the exhaust from the motor comes out immediately behind the step in the main float, with the object of producing a layer of gas abaft the step in order that the get off from the water may be speedy. Again, in an airboat exhibited at the last Olympia show a pair of quadri-spherical cowls, fitted on top of the float, lead air down sloping-aft tubes to just behind the step, with the same end in view. Even though the introduced exhaust in the one case and air in the other achieve their object when the airboat is rising, it might be asked whether they are worth while when their detrimental effect on the streamlines when in the air is considered, says James E. Steele, Associate Member Institute of Naval Architects, in British *Aeronautics*.

When flying, the lift, which would otherwise be exerted by the sweet-flowing streamlines beneath the float, is in part destroyed by the disturbing influence of the introduced air or exhaust; this results in a lift-reduction due to the loss in air reaction.

The air issuing from the bottom of the float at an angle of about 45 degrees to the stream lines will disturb their natural flow, resulting in the lift-reduction mentioned above. It might be thought that the admission of air behind the step would get rid of the negative pressure or suction at that part, but air admitted for that purpose would only increase the body of dead air which must be dragged along with the float.

To retain what good there may be when rising, and yet to get rid of the adverse effect when flying, means should be provided for cutting out in both the cases mentioned, when the machine is in the air. Cowls capable of being housed when flying would achieve that object in the one case, besides doing away with the drag which they exert.

FLYING BOATS ARE OFFICIALLY MOTOR BOATS

While to require flying boats or hydroaeroplanes when operating in the water as motor boats to be equipped in accordance with the Act of June 9, 1910, will impose conditions which might interfere, at least to some extent, to their use out of water; at the same time, it is the opinion of E. E. Chamberlain, Commissioner of the Department of Commerce, in a letter to AERONAUTICS, that these vessels which go at a high rate of speed should, for the protection of other vessels, be equipped with lights if navigated after sunset, and for the protection of those on board should have life saving devices. The course which they propose to take should be indicated by signals as in the case of other vessels and if they are in a fog their position should be indicated. "I am inclined to think, therefore," says Mr. Williams, "that while navigated as motor boats they are required to have equipment on such vessels and comply with the Rules of the Road," as contained in Department Circular 236.

The rules of the department provide that these craft, motorboats, must be inspected by the local inspectors; they are divided into classes—less than 26 feet, 26 feet to 39 feet inclusive, and 40 feet to 64 feet. Certain lights must be carried after sunset, and these of a certain size and properly positioned. Whistle, fog horn, bell are other fittings. If carrying passengers for hire, certain life preservers must be carried and the pilot must be licensed. A fine of $100 is provided. The act is enforced by collectors of customs and other officers.

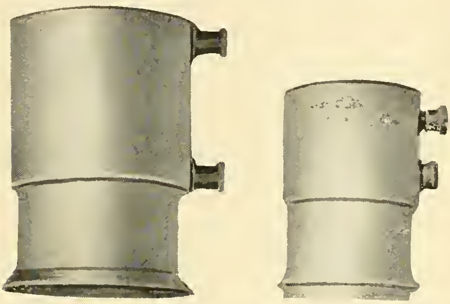
Airships are not made of air, neither are they exactly shipshape. But let not these inconsistencies discourage you, for if an airship is not what you think, it is at least as dangerous as it looks. But why speak of danger—look at the people who marry!

—"Doctor" S and "Doctor" W.

NEW HALL-SCOTT—100 H. P.

The new 100 H. P. motor of the Hall-Scott Motor Car Co. has been built especially for the flying boat, although it can be used directly connected in any standard machine. Enough power is provided to lift a standard flying boat into the air under any weather conditions, or get off the water with more passengers. The bore and stroke is 5 inches respectively.

Their system of cylinder construction is much similar to the previous models. Cylinder walls, heads, and pistons are cast from a special grade of close grained grey iron. Main cylinder walls are machined upon both sides. Steel water jackets are autogenously welded to the cylinder walls, forming non-leakable joints; the steel of such thickness that it is not readily dented. The assembly is then baked, enameled black on the outside, and ground to size.



Comparison of the 80 H. P. and 100 H. P. Cylinders

Cylinder heads are cast with water jackets completely encircling the valves, so that there is no danger of the valves sticking or breaking from overheating. The inside of the head is carefully machined to insure equal compression. Two plugs are carried in the head, a Bosch magneto firing both at the same time, insuring increased power over the single system.

Particular attention is called to the strength and rigidity of the cylinder and head assembly mounting on the crank case, the five steel rods brought from inside the crank case and passing through the heads, to which they are securely bolted. Copper asbestos gaskets placed between head and cylinder provide an easy means of assembling and an absolutely tight joint.

Crank cases are of the best aluminum alloy, hand scraped both inside and out, and hand polished on the outside. The bottom oil case is removable, so that main bearings, etc., may be easily inspected. A large capacity oil pump is cast integral with lower case, providing enough oil for a run of seven hours.

The crank shaft is hand forged from one piece of special heat treated steel, machined and ground to size, and accurately balanced. It is supported on five bearings of unusually large diameter. The cam shaft gear is driven by a gear, formed integral with crank shaft. All main bearings of Wm. Cramp's white metal. Main bearing caps are of aluminum alloy with heavy steel strap supporting same.

Cam shaft is of heavy, seamless steel tubing, supported on five bearings. Cams of machine steel, hardened and accurately ground to size and doubly pinned on cam shaft.

Large 2½ inch nickel-steel valves are placed directly in cylinder heads, no valve cages used, which allows of simplicity in design, the head being easily removed, and equal compression in all cylinders.

All connecting rods are of I beam construction, made of special carbon steel, drop forged and heat treated, which develops great stiffness, and prevents crystallization. They are bored and reamed on special machine tools made for this one purpose, which absolutely insures correct centers and alignment. The connecting rod caps are held in place by special nickel-steel bolts, properly secured by locking device.

The oiling system is a combination force feed and splash, with constant level. The oil is circulated by means of a gear pump, which forces the oil in equal amounts to the different individual compartments in which the connecting rods dip, and an absolutely constant level is maintained at any motor speed.

Liberal allowance is made in cylinder jacket space, in the size of water pipes and all connections, to allow of perfect cooling of the motor under most severe conditions. A large capacity centrifugal pump is used in connection. Connection between the cylinder and head is made with pipe by-pass, preventing any danger of water leak into cylinder.

The 80 and 100 Crank Cases

AERONAUTICS

Published Monthly by Aeronautics Press
122 E. 25TH ST., NEW YORK
CABLE: AERONAUTIC, NEW YORK
'PHONE, 9122 MADISON SQ.
ERNEST L. JONES, Pres't — — THOMAS C. WATKINS, Treas'r-Sec'y
ERNEST L. JONES, Editor — M. B. SELLERS, Technical Editor
HARRY SCHULTZ, Model Editor
SUBSCRIPTION RATES
UNITED STATES, $3.00 FOREIGN, $3 50

No. 71 JULY, 1913 Vol. XIII, No. 1

Entered as second-class matter September 22, 1908, at the Postoffice, New York, under the Act of March 3, 1879.
¶ AERONAUTICS is issued on the 30th of each Month. All copy must be received by the 20th. Advertising pages close on the 25th.
¶ Make all checks or money orders free of exchange and payable to AERONAUTICS. Do not send currency. No foreign stamps accepted.

Aero Mart

RATES: 15 cents a line, 7 words to the line. Payment in advance.

MOTORS FOR SALE

ENGINE FOR SALE—8-cyl. "V," list price, $1,500; new, never used. The one who buys this motor gets one of those few real bargains that isn't picked up every day. Thoroughly tested by maker who desires to sell the last one in his shop. Complete with propeller, $800. Address, "Eight Cylinder," care of AERONAUTICS, 122 E. 25th St., New York.

BARGAIN—50 H. P. Gnome; also 50 H. P. Anzani. Both guaranteed in excellent condition. Will sell cheap owing to death of aviator. Address, Rose, AERONAUTICS.

AEROPLANES

SACRIFICE—A Curtiss type biplane, flown by one of America's most famous aviators, with 8 cyl. Hall-Scott 60 H. P. motor, all in A1 condition, for $1,800 cash, subject to demonstration to bonafide purchaser. Shipping boxes, propeller, crates, completely equipped for the road. Free instruction in flight to purchaser at well-known flying field. The best bargain of the season. Opportunity knocks but once at every man's door. Address "Sacrifice," care of AERONAUTICS, 122 E. 25th St., New York.

FOR SALE—Tractor biplane. Good exhibition machine. Tent, extra parts, crates, $400. Eight cylinder 60 H. P. motor, Bosch magneto, Schebler carburetor, radiators, gas tank, two propellers, fully guaranteed, $800. F. Robinson, 59 Glasgow St., Rochester, N. Y.

BARGAIN—30 foot Curtiss type biplane, with 5 foot extensions, chord 5ft., single surfaced, laminated ribs, dble. surf. elevator, 4-cyl. 50-60 H. P., new. Engine turns 6 by 5 propeller at 1,500. Also extra 7 ft. propeller. Engine alone cost $1,600. Can be seen any time. Must be seen to be appreciated. $850 whole outfit. Address W. B. R., care of AERONAUTICS, 122 E. 25th St., New York.

FOR SALE—My 38 ft. double surfaced mono., weight 750 lbs. Exceptionally well built of best materials, 8 foot 2 inch propeller. Simple control (see November, 1912, AERONAUTICS). Machine now powered by 4-cyl. 30 H. P. Boulevard engine, which is light. Am unable to finance further. Complete machine, tools, etc., for first $1,000. Will sell power plant separate including engine, complete ignition system, special designed 18 lb. radiator for $150. Herbert Kellogg, Kewanee, Ill.

IMMEDIATE SALE NECESSARY! One Model "D" genuine Curtiss aeroplane with hydro attachment, equipped with brand new Model "O" Curtiss 80 H. P. motor. Full equipment of exhibition extras. Everything in good mechanical condition; $3,200 cash will buy it. Act quick. K. care of AERONAUTICS.

MISCELLANEOUS

WISE—One copy of the rare book by John Wise, A System of Aeronautics, for sale to first comer at $10. First-class condition. This book is getting more rare every day. Address Sheahan, care of AERONAUTICS, 122 E. 25th St., New York.

BACK NUMBERS OF AERONAUTICS WANTED —Volume one, number five; volume two, number two; volume three, numbers two and four; volume four, numbers four, five and six; volume six, number one. Address Arvis Roach, 401 Cedar St., San Antonio, Tex.

HYDROAEROPLANES, AEROPLANES, MOTORS—30, 50, 75 H. P. Great Bargains. Demonstrations. Patterson, A986 Trumbull, Detroit.—July.

WANTED ENPLOYMENT—Young man, 25 years old, no bad habits, engine expert, designed and built machine for past 5 years, also considerable work in gas engine designing, wants position with firm or individual in aeronautical work. Herbert Kellogg, Kewanee, Ill.

MERCHANDISE WANTED

WANTED—A 60 or 70 H. P. aero motor. Must be water cooled, with radiator, magneto, propeller, all complete. Price not over $500. Hall-Scott preferred. Address Motor, care of AERONAUTICS, 122 East 25th St., New York.

A special designed 2 inch carburetor is furnished which is adjustable from the aviator's seat.

With the exception of crank cases, cylinder heads, water and oil pumps, etc., all parts are fully nickel plated.

This motor is claimed to actually develop 120 brake test at 1,500 R. P. M. "Rating its propeller thrust test, as most aviation engines are rated, it actually delivers 175 H. P. at 1,500 revolutions," the manufacturer states.

The Hall-Scott Motor Car Company rate this motor by brake test at 1,500 R. P. M. "During a recent four-day test, this new type motor never failed to register under 120 brake test horsepower at 1,500 R. P. M. Taking the horsepower by propeller thrust, or wind horsepower, it actually registered 170 H. P. at the same speed."

In placing such a motor before the public, this company believe they have come as near as possible to perfecting a motor that will run as long and constantly as a slow speed stationary engine. This is due to the fact that special care has been taken in the cooling system as well as the large bearing surface to the crank shaft, connecting rod, and cam shaft bearings.

THE BILLINGSLEY ACCIDENT

Some conclusions have been arrived at by Captain W. Irving Chambers from the fatal accident to Ensign Billingsley, all the details of which were fully known. It shows: (1) the advantages of sticking to the machine, especially in flights over water; (2) that safety straps should be used invariably; (3) the necessity for wearing a life saving coat or equally effective device in flights over water; (4) the desirability of a standard control—this has now been systematically decided for the navy.

No fault has been attached to the machine which had been fully examined and parts thereof tested. It was a Wright with Curtiss 8-cyl. engine and Curtiss pontoon with wing tip balancing floats. The machine was extra strengthened, which, no doubt, prevented its collapse during the fall.

The illustration shows this machine the navy's B2. Note flotation and freeboard. Lieut. Ensign Herbster was particularly pleased with the pontoon and engine, and used it in his altitude flight.

HEAT AND COLD RETAINING BOTTLES

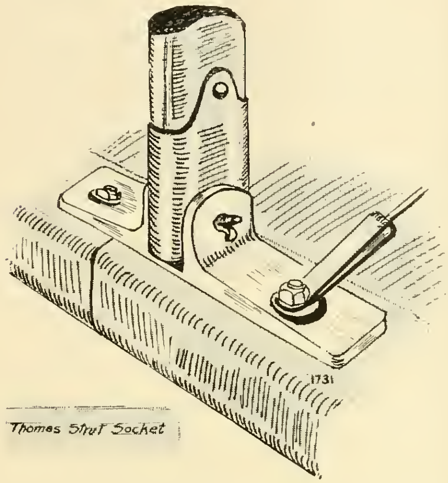
We have been advised that the new Icy-Hot Bottle for keeping things hot or cold has been so improved that it will withstand the ordinary jars and jolts of setting down too hard or even dropping. This great stride in the manufacture of these bottles means a great deal to sportsmen as they are unable at all times to give things their proper care. They

are absolutely guaranteed to keep hot liquids hot 24 hours or cold liquids cold 3 days. The Icy-Hot is the same double glass bottle vacuum principle, discovered by James Dewar in 1892, but through ingeniously inserted shock absorbers it has been commercialized to the extent that it is now considered a necessity, and is as simple as a child's toy. The Icy-Hot Bottle Company is located in Cincinnati, Ohio.

The Navy's B-2

SIMPLE STRUT SOCKET

The strut socket used by the Thomas Brothers is very simple, makes possible the removal of struts without loosening or detaching any wires or cables, nuts or bolts, or else.



A heavy cotter pin keeps the strut in its place in the socket. The angle of the casting is figured out so that these sockets may be used for either front or rear struts by simply turning them end for end. The casting is of aluminum.

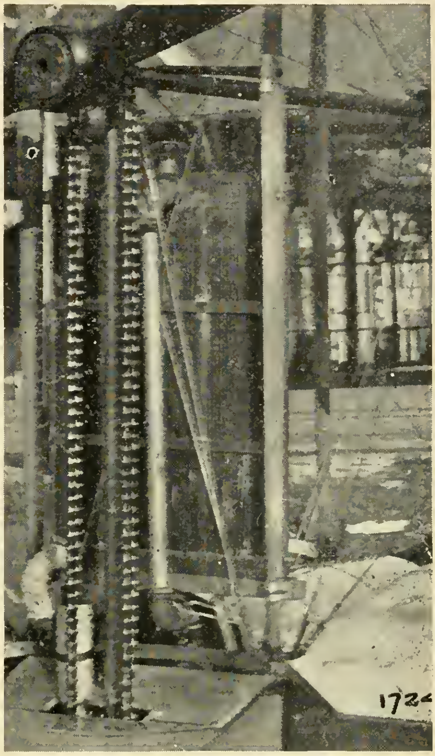
BENOIST'S CHAIN DRIVE

The illustration shows the chain drive of the Benoist flying boat. Since the photo was taken, Shelby tubing chain guards are used. The engine is cranked by inserting a lever in a ratchet at the forward end of the propeller shaft, the operator standing up in the front by the seat. The chain is standard Diamond 1⅛ inch roller, 1 inch pitch. Both engine and propeller sprockets have 18 teeth. The propeller shaft is wired in with Roebling cable with spoke nipple turnbuckles.

The engine shaft and propeller shaft is separated by a distance rod which is adjustable, this distance rod, of course, carrying one-half inch "two in one" New Departure ball bearings at each end.

The forward end of the propeller shaft is also carried in a ball bearing, and the four thrust wires originally used to take up the thrust of the propeller, have since been changed to two upper thrust wires, but the two lower ones have been replaced by two spruce thrust members extending from the bearing housing at the rear end of the propeller shaft anchored down at the lower end of the front engine struts.

Newspapermen usually re-write their stolen dope but an aeronautical weekly in this country takes the whole thing bodily from advance sheets of AERONAUTICS and prints it as an important piece of A. W.'s own news.

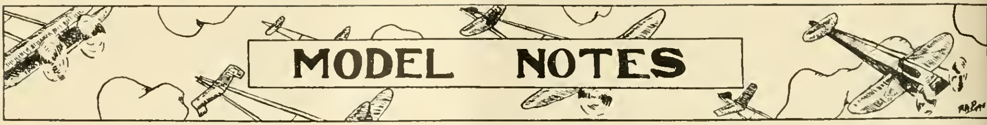


Benoist Chain Drive

BLERIOT CAN NOW LAND ON VESSELS

According to cabled reports, Louis Bleriot has devised a scheme by which aeroplanes may take flight from steel ropes stretched over the deck of a vessel, and land upon the same. It is said that successful trials have been made of the device.

Leo Stevens may be very careful in counting out the aviator's share of the money; indeed, he is over careful. Sometimes he figures out there's nothing coming to Stevens at all when the aviator gets his.



Obst Hydro

By HARRY SCHULTZ

The hydroaeroplane model herein shown and described was constructed by Mr. Charles V. Obst, of Cypress Hills, Long Island. Mr. Obst was lately elected president of the Long Island Model Aero Club and it may be well stated that he is very capable of filling that office. Mr. Obst is one of the neatest constructors of model aeroplanes in America today, and all his models are original with him, and are worked out on a scientific basis.

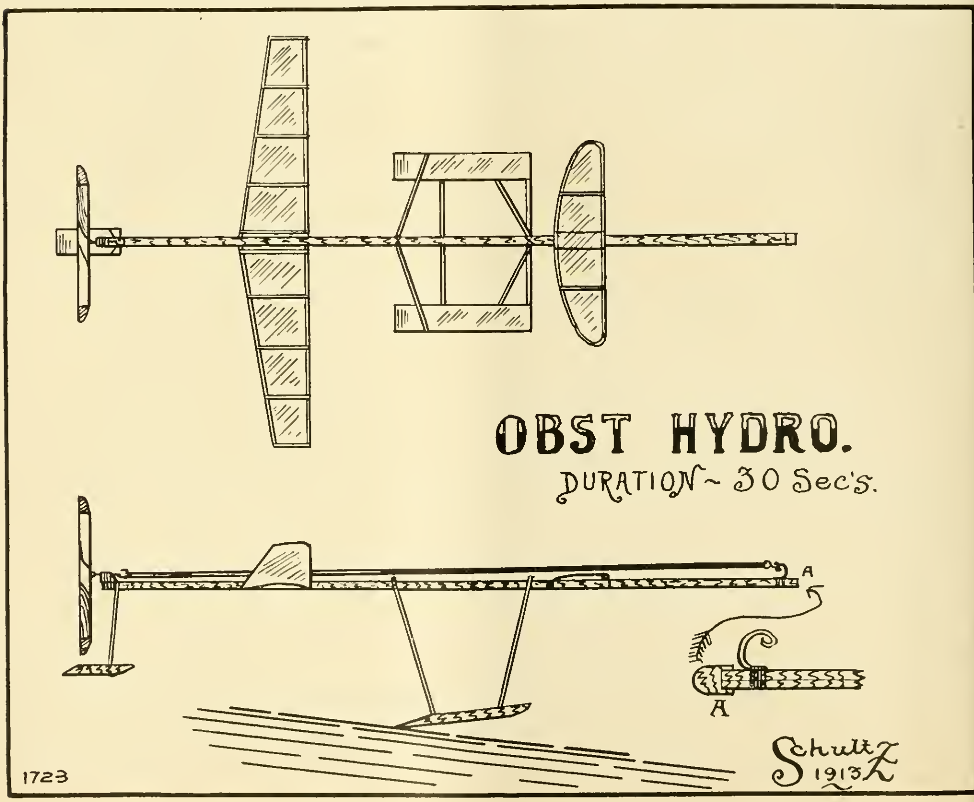
The model shown in the accompanying drawing holds the world's record for single propeller hydros, having made a duration of 30 seconds; and, in fact, is the first successful single propeller hydro model in the world, with the possible exception of the Bragg Smith model of England.

The fuselage consists of a single stick of balsa wood, one-half inch square at the middle, tapering to one-half by one-quarter of an inch at the ends. The stick is 40 inches long and is made of two pieces of wood ½ inch by ¼ inch laminated together for strength. A small pine plug is fitted to the front of the stick as shown at "A" to protect the same, as balsa wood is very soft. The bearing for the propeller is placed on the rear end of the stick as shown, and the stick is given a coat of shellac.

The planes are constructed of bamboo, the main plane having a span of 23¾ inches, the chord at the center being 4 inches and at the tips 2 inches; area 69 square inches. The elevator has a span of 12 inches and a chord of 3 inches at the center. The main plane has a dihedral angle of 150 degrees, and in the center of the same a slot is left for the center stick to fit in. Both planes are covered on the under side with silk fibre paper treated with Ambroid.

The propeller is nine inches in diameter and has a pitch of 11½ inches. The width of the blade is $1\frac{5}{16}$ inches. The propeller revolves at 1,160 R. P. M., gives a thrust of 3¼ ounces and is driven by 18 strands of ⅛ inch flat rubber, the rubber being carried above the single stick.

The pontoons are constructed of $\frac{1}{32}$ inch spruce and are covered with double thickness of silk fibre paper coated with Ambroid.



The New Benoist Flying Boat in Action

← BENOIST ←

PLANES hold the following records:

World's long distance hydro record with one passenger.
World's long distance hydro record with two passengers.
American endurance record, aviator and three passengers.
Have more world's records than all other m'f'rs combined.
The first successful Tractor Biplane built in America.

Records indicate superior efficiency.
Why not get an efficient machine while you are about it?

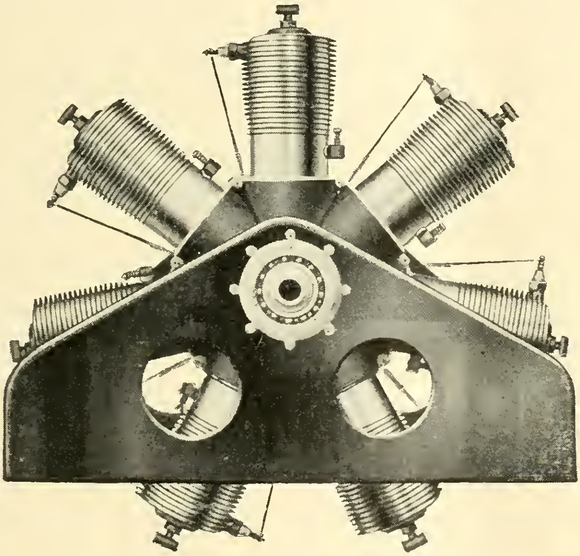
BENOIST AIR CRAFT CO.
6628 DELMAR BLVD. ST. LOUIS, MO.

---

50 H. P. 160 POUNDS

GYRO MOTOR

80 H. P. 207 POUNDS



Built of Nickel Steel and Vanadium Steel Throughout

Endurance Record to Date
4 hrs., 23 min.

From the
"MOTORWAGEN"
of Nov. 20, 1912

In the testing establishment of Dr. Bendemann at Adlershof (near Berlin), a 7-cylinder Gyro Motor was recently tested. In a 5-hour endurance run and at 1,000 R. P. M., an average of 45.7 H. P. was obtained. The fuel consumed was 14.7 kg. gasoline per hour and 3.06 kg. lubricating oil, which is more favorable than the Gnome motor of the same horse-power. The weight of the motor was 73 kg.

Send for Catalog

THE GYRO MOTOR COMPANY, 774 Girard Street, Washington, D. C.

MAGNALIUM

12 1-2% LIGHTER, 15% STRONGER

AND OVER TEN TIMES AS TOUGH AS THE BEST ALUMINUM CASTINGS. WEIGHS ONE-THIRD AS MUCH AS IRON. : : : : :

FOR CYLINDERS, PISTONS, CRANK CASES, SOCKETS AND OTHER AEROPLANE FITTINGS

G. A. CRAVEN & CO.
81 NEW STREET, N. Y. C.
METAL DEPT.
MORRIS R. MACHOL

HYDROS

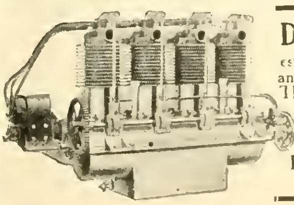
BUILD YOUR OWN

Over 100 complete drawings. Scale 1" to foot; some full size Prints 28" x 36"

ONLY COMPLETE PRINTS EVER SOLD

$8.00

AERONAUTICS, 122 East 25th St., New York



DON'T write us unless you are interested in a reliable, efficient and economical power plant. That is the only kind we build. Four sizes.

Reasonable Prices

Kemp Machine Works
Muncie, Ind.

The main or front pontoons each measure 7¾ inches in length, 1½ inches in width and ½ inch in depth, and are divided up in five airtight compartments, these compartments being constructed or formed by double thicknesses of silk fibre fastened across from upper to lower braces. The rear pontoon measures 3¾ inches in length, 1½ inches in width and ½ inch in depth, and is divided into two airtight compartments in the same manner as the main pontoons.

The main pontoons are fastened to the frame by rubber bands, are held 6½ inches below the main stick by diagonal bamboo braces as shown at an angle of 10 degrees to the water level. The rear pontoon is placed at the extreme rear, extending under the propeller and is fastened to the main stick by two upright bamboo sticks as shown.

The model rises in 4 or 5 feet, flies at an altitude of 30 or 40 feet and is a fast, steady flyer. Complete and ready for flight, it weighs 4½ ounces.

MODEL NOTES BY HARRY SCHULTZ

In the first interclub contest in America which was held a few weeks ago at Ralph and Church Avenues, Brooklyn, N. Y., the following clubs entered: N. Y. Model Aero Club, Long Island Model Aero Club, Bay Ridge Model Aero Club and Summit Model Aero Club. Owing to the inclement weather and many other obstacles the Summit and New York clubs became discouraged and fell out of the race, leaving the contest to be bitterly fought out between the Long Island and Bay Ridge clubs.

The following are the results of the contests, it being seen that the Bay Ridge club is the winner, it having 94.41 points to 93.02 points of the Long Island Model Aero Club.

	L. I. Points	Bay Ridge Points
Distance from hand	20	14.53
Duration, hand	20	19.88
" ground	19.38	20
Distance "	14.89	20
Duration, water	18.75	20

The cup for which the above contests were held, was kindly offered by Mr. Francis A. Collins of New York.

In order that all records for model flying may be held by America it has been decided to hold an interclub tractor contest, the record for tractors now being held by England. All persons interested kindly communicate with Mr. Edward Durant, Aeronautical Bureau, World Bldg., New York City.

Great interest has been aroused among the model enthusiasts by a contest to be held shortly, known as the Scientific Contest. The models must weigh 8 ounces without the rubber, and must be a scale model or a prototype of a full size machine. In order that models may be studied from a more scientific point of view and that the so-called "flying stick" may be done away with, a club to be known as the Scientific Model Aero Club is now in the process of formation. The meeting will be held in the board room of the World Building. All persons interested in this branch of model aeronautics should communicate with Mr. Edward A. Durant for particulars regarding the club.

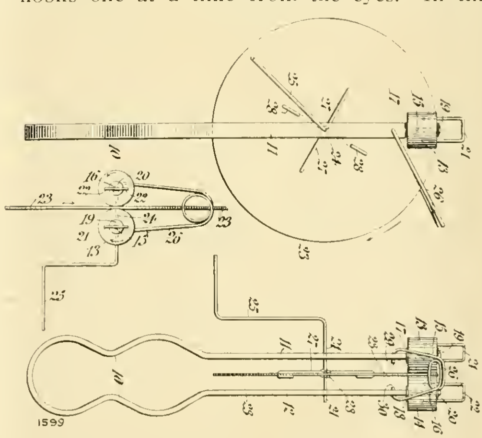
Model flying contests are held every Sunday afternoon at the field of the Long Island Model Aero Club, Old Mill Park, Crescent Ave., Brooklyn, N. Y.

NEW WORLD DISTANCE RECORD

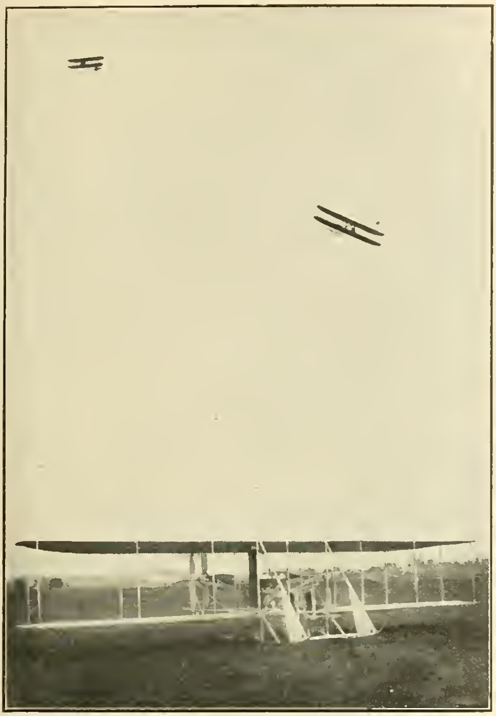
The world's model distance was broken June 14, 1913, at the Cicero Aerodome, by Arthur Nealy, former President of the Illinois Model Aero Club, according to the Aero Club of Illinois of the Windy City. "The distance made was 2,740 feet and duration was 72 seconds. The model was a very fast one and a very good climber as the average altitude was 400 feet. The distance was taken by the officials of the Illinois Model Aero Club. This was the final meet for distance machines and the club is now devoting its time to hydros.

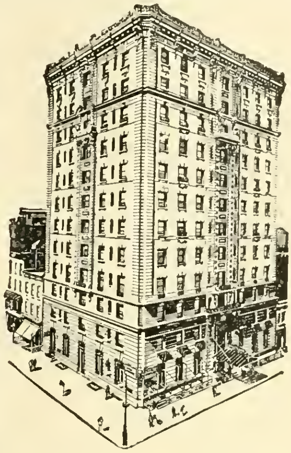
STRAND TWISTING DEVICE

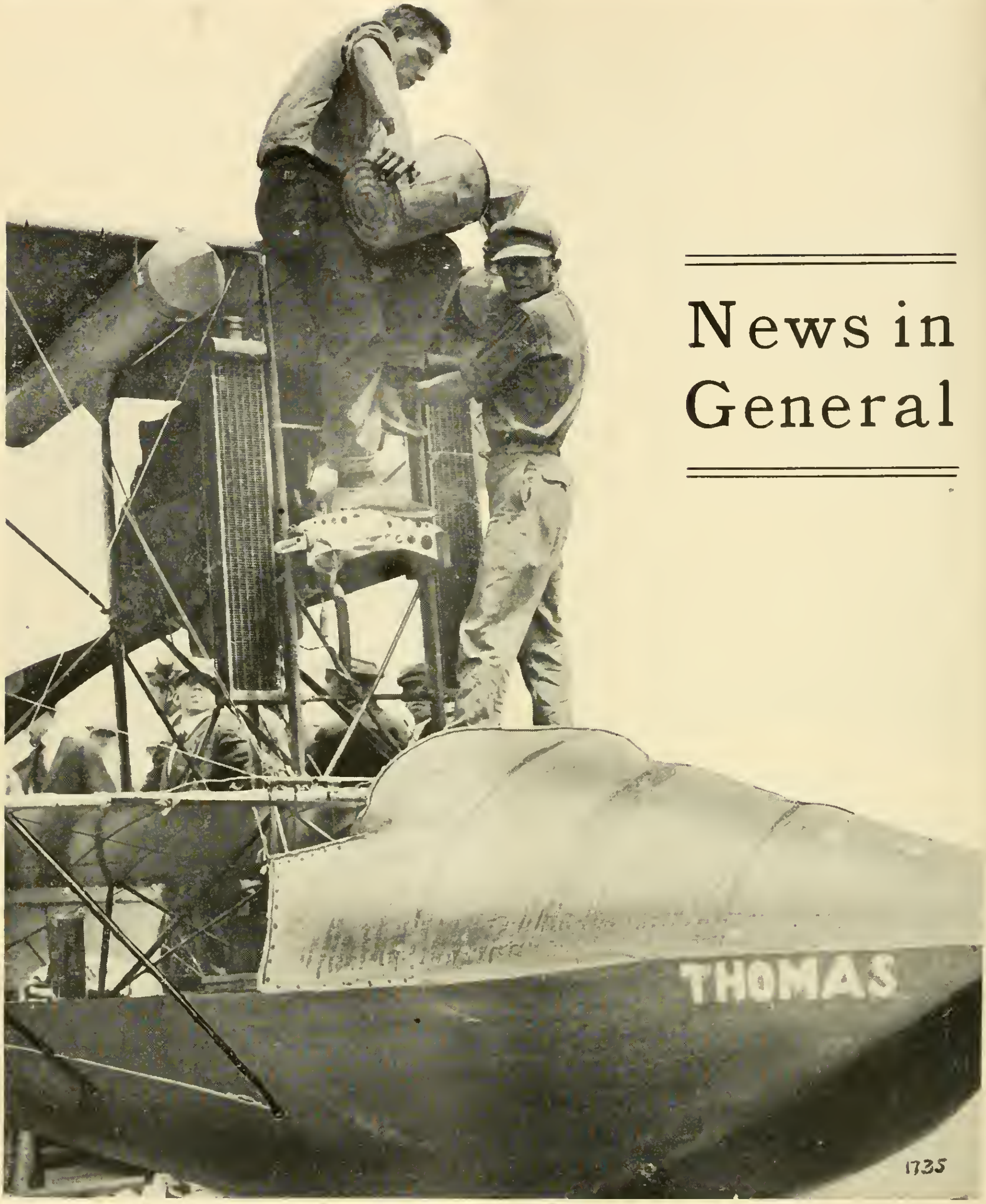
Model flyers will be interested in the device of Montague Palmer, of New York, for winding up rubber power plants. In the device shown in the illustration there are two friction wheels each of which carries an eye consisting of a U-shaped piece of wire secured at its ends in the wheel, thus the wheels with these eyes form twisting heads to which the elastic strands of twin propeller machines are attached. These small wheels are driven in opposite directions by friction from a driving wheel 23, which wheel is retained in engagement with a spring as shown. Proper bearings are provided for these wheels and the shafts. In winding, the two strands of rubber are secured by their hooks in the eyes 21 and 22 and turning the crank operates the small wheels in opposite directions. When wound the strands are disengaged by removing their hooks one at a time from the eyes. In this



way both strands are wound up the same number of revolutions simultaneously. The patent has been assigned to H. Rosenstein of the Ideal model concern.







News in General

The Thomas Flying Boat in the Lakes Cruise

NEW INCORPORATIONS

Shaw Aeroplane Co., Indianapolis, Ind., $10,000. The directors of the new company are B. Russell Shaw, a local aviator; F. Russell Horn, L. L. Boyer, N. V. Boyer and N. E. Carter.

International Aerial Company, Boston, $50,000; Guiseppe Colucci, Carlo F. Arzillo, Sophia J. Lager.

BUSINESS TROUBLES

Papers have been served in a suit by the City of New York against the defunct Walden-Dyott Co. for the collection of taxes.

DEATH OF KERNS

Thaddeus Kerns, an aviator, 20 years old, was killed at Chico, Cal., July 15. When the wreckage hit the ground the radiator crushed the aviator's head, while other parts of the biplane pierced his body.

IMPORTS AND EXPORTS

At the end of May, for which report is just issued, there remained in warehouse 10 foreign built aeroplanes and parts, valued at $10,084. Perhaps aviators lack the funds to take them out or send them back. Exports for May totaled but 1, at $2,752. No imports and exports of foreign machines.

VILAS CROSSES LAKE MICHIGAN

On July 1st, Logan A. Villas, in his new Curtiss flying boat, flew across Lake Michigan, from St. Joseph, Mich., to Chicago, Ill., a distance of 64 miles in one hour and ten minutes. The start was made from St. Joseph at 4.15 P. M., with William Bastar of Benton Harbor, as passenger. The flight was made at an average height of 3,000 feet. This was the first aeroplane flight across Lake Michigan. Details of the Vilas boat appeared in the last issue.

NATIONAL BALLOON RACE

The national championship balloon race from Kansas City, July 4, to decide this year's championship and to select the team of three to represent America in the international race from Paris this Fall, was won by the balloon "Goodyear," R. H. Upson, pilot, and R. A. D. Preston, aide. The balloon was built by the Goodyear Tire and Rubber Co., and both the aeronauts are good fellows connected with that company. This balloon made the longest duration in the race, 19 hours 52 minutes.

There were seven entries but only five balloons actually got away from the grounds. Following is a table of the contestants, the first three being now eligible for the American team:

"Goodyear," R. H. Upson and R. A. D. Preston, to West Branch, Mich., 685 miles.

"Kansas City II," John Watts and Geo. J. Quisenberg, to Goodrich, Mich., 673 miles.

"Kansas City Post," Capt. H. E. Honeywell and W. C. Gifford, to Rockwood, Mich., 658 miles.

"Mill. Population Club," John Perry, Albert Von Hoffman and A. Von Hoffman, Jr., to Manchester, Mich., 616 miles.

"Overland," Roy F. Donaldson; unplaced, as no reports sent in of landing. If he is going yet there ought to be a new record.

BALLOON ASCENSIONS

Phila., July 1.—Dr. T. E. Eldridge, Dr. Geo. H. Simmerman, Helen Simmerman and Mrs. Chas. Pooley in the "Phila. II" to North Penn.

Phila., July 8.—Rob't. E. Glendenning and A. M. Biddle, Jr., to Hammonton, N. J.

Kansas City, July 4.—E. S. Cole piloted three young women in the Kansas City III in a 21 mile trip.

Akron, O., June 22.—R. H. Upson, pilot, and R. A. D. Preston, both of the Goodyear Tire & Rubber Co., in the "Goodyear" at 10:05 P. M.

NEW PILOTS

Following are the new pilots certificated, with date and place of trials:

239. Henry K. Crowell (Wright copy with Gyro motor), College Park, June 6.
240. E. Wm. Steele (Curtiss), Los Angeles, June 15.
241. Lt. C. G. Chapman (Wright), Manila, May 13.
242. Lt. Herbert Dargue (Wright), Manila, May 2.
243. Lt. Clyde P. Rich (Wright), Manila, May 5.
244. Tomoshige Ikuhara (Curtiss) San Diego, June 28.
245. Alfred F. Lym (Curtiss), San Diego, June 30.
246. John A. Bixler (Wright), Dayton, July 2.
247. Bernard L. Whelan (Wright), Dayton, July 10.
248. A. A. Bressman (Wright), Dayton, July 14.
249 Jos. A. Ritchie (Curtiss), San Diego, June 28.

GROVER BELL

Petaluma, Cal., July 6—In trying to avert a collision with a frightened horse which dashed across the field as Grover Bell was finishing a glide resulted in his death. Bell threw his machine over too far and came down head foremost. He died next day from a fractured skull.

DEATH OF LIEUT. CALL

Houston, Tex., July 8—Lieut. Loren H. Call, U. S. Signal Corps, was killed on this day in an army aeroplane near the aviation camp at Texas City.

The Board of Officers appointed by Gen. Carter to investigate and report on the circumstances connected with the death of Lieut. Loren H. Call, C. A. C., reported the accident to have occurred as follows:

Lieut. Call left the aviation field in a type C Wright aeroplane at 6.21 a. m., July 8, 1913. He climbed till he attained an altitude of about 800 or 1,000 feet. He was flying towards some smooth ground at a different part of the camp in order to take some tests to qualify as "Military Aviator" While flying at this altitude it appears that one wing dropped but the machine was brought to the level immediately. A very short time afterward the left wing dropped very much so that the machine made an angle of about 45 degrees in the air. Lieut. Call evidently attempted to straighten out the machine by making a turn to the left and pointing the nose of the machine down, for at this time the machine took a very steep angle downward. From that time on this angle gradually increased until the aeroplane came down towards the earth perpendicularly. At about 200 or 300 feet from the ground the plane began to turn upside down and during that turn the wings collapsed and the machine dropped to the ground.

It appears that the machine hesitated a moment as it began to turn upside down at the end of the drop during which time Lieut. Call climbed out on one wing, evidently with the intention of straightening out the machine as that wing was a trifle higher than the other one. However, when the machine hit the ground the wing to which Lieut. Call was hanging struck the ground first.

There is no evidence to show that the machine was broken in any parts until it began to turn upside down at the end of the drop. However, at the time the machine made this turn it apparently collapsed.

The board further called attention to the fact that the testimony of the eye witnesses of the accident shows that Lieut. Call preserved his possession to the last moment and did all in his power to right his plane.

ROBINSON APPRECIATES NAIAD CLOTH

Hugh Robinson, of the Benoist Aircraft Co., writes the C. E. Conover Co.: "After using your Naiad aeronautical cloth for several years I wish to say that I find it entirely satisfactory in every particular. I find it particularly well adapted to hydroaeroplanes as it is not affected by the action of either salt or fresh water."

At the Burgess works the editor noted the fine wing finish produced by the Conover "dope" which is now used in preference to the already prepared fabric. This varnish is put on with a brush after the cloth is stretched and tacked, making it water, weather and fireproof.

GREAT LAKES FLYING BOAT CRUISE

Flying about 885 miles, from Chicago to Detroit, in less than fifteen hours flying time, the only one out of five starters to finish the course, J. B. Verplanck's Curtiss flying boat, with Beckwith Havens as pilot, won the cruise, though one day late according to the schedule. Mr. Verplanck was a passenger throughout the trip. The trip started July 8 and finished July 18.

The starters were: Antony Jannus in the Benoist machine, Walter Johnson in the Thomas, Glenn L. Martin in the Martin Tractor, and Roy N. Francis in the Paterson-Francis. Owing to an accident Martin had to delay the start until Friday, July 11.

The details of the race, day by day, are as follows: Tuesday, July 8.—Jannus started with Paul McCullough from Grant Park, Chicago, with Havens close on his heels in advance of a big storm. Jannus and McCullough, his passenger, flew as far as Gary, Ind. The propeller was broken off at Gary and they started to paddle seven miles to shore. A gale struck them and completely wrecked the machine and the boys were rescued by a tug. The machine has never been found. The race was abandoned by Jannus at this point.

Havens reached Michigan City and made the approximately 50 miles in 50 minutes, actual flying time. He made but one stop and this was to offer assistance to Jannus.

Johnson started third, without a passenger, but got to land before the storm broke at Robertsdale, Ind., just outside of Chicago. Francis did not start until the following day on account of the high wind.

Walter Johnson abandoned the race here on the 12th after an unsuccessful attempt to get a start from Robertsdale, Ind., where he had been delayed. Johnson launched his craft and started the engine. Heading into the face of the sun, he failed to notice a piece of wreckage which punctured two of the watertight compartments; he had no facilities for making the necessary repairs.

Marshall Earl Reid's Curtiss Flying Boat as it struck, nose first, on the marsh back of Wildwood. When Reid struck the "hole in the air" which wrecked his boat he started to glide to a lagoon, but the flying boat came down within 14 feet of the water's edge and safety. The planes were smashed, but the boat did not receive so much as a scratch. The boat will be repaired.

Wednesday, July 9.—Havens flew from Michigan City to South Haven for more gasoline. He finally flew into the harbor at Macatawa by dark.

Hot in pursuit of Havens, Roy M. Francis, with Irving in the passenger's seat, started from Chicago and flew to Michigan City. After taking on a fresh supply of gas he left Michigan City for Macatawa Bay, expecting to overtake Havens. It was nearly 7 p. m. when Francis made an attempt to start for Macatawa but ran into a log and he was forced to put back to shore for the night.

Johnson stayed ashore at Robertsdale.

Thursday, July 10.—None of the contestants made an attempt to proceed, owing to the high winds.

Friday, July 11.—Francis left South Haven and flew over the land to Macatawa, alighting on the water there at 7.15 a. m. and was under way again an hour later, flying to Pentwater, 236 miles from Chicago.

Havens and Verplanck flew from Macatawa to Pentwater, a distance of 74 miles in a headwind.

Glenn L. Martin, the last of the contestants to start, sailed away from Chicago at 7.30 a. m. He set out to catch up with the leaders and registered the record day's mileage thus far, a distance of 162 miles. He flew the distance from Chicago to the first control, Michigan City in 40 minutes, a distance of 50 miles. He stopped at Michigan City for one hour, and was off again. After stopping at the Macatawa control, 84 miles away, Martin, with Charles Day, as passenger headed for Manistee. A thumbscrew worked loose on his carburetor and dropped off a spring. They glided to the surface of the water at Lake Harbor, near Muskegon, a distance of 162 miles from Chicago.

Saturday, July 12-13.—High winds, rough seas and accidents to machines from the storm, during the night, suspended the race for the day, with the only three flyers, who remain, at the same points where they spent the night.

Monday, July 14.—Havens and Verplanck started from Pentwater, were checked past Manistee and arrived at Frankfort for gasoline. Starting again from Frankfort they flew to Charlevoix, Mich.

It was reported that Martin left Muskegon and flew to Pentwater within an hour after Havens soared away from the latter town.

Roy Francis made several unsuccessful attempts to leave Pentwater in the afternoon and finally announced that he would pack up his boat and return to Chicago, the referee having disqualified him.

Tuesday, July 15.—Glenn L. Martin returned to Muskegon, Mich., this afternoon from Pentwater and withdrew from the cruise.

After Francis and Martin had withdrawn from the contest, Havens set out from Charlevoix and passed the checking station at Mackinac Island and landed at Duncan, near Cheboygan. They were away again after lunch and then made the longest non-stop flight of the cruise, a distance of 105 miles to Alpina. Then setting out again at 5.45 they flew to a port near Point Lookout, landing at 7.35 p. m.

Wednesday, July 16.—Havens flew to Bay City, thirty miles away, flying the distance in 40 minutes.

Thursday, July 17.—Owing to the bad weather in the morning, they did not start until 12.29 p. m., flying through a storm, which broke while in flight, they reached Port Sanilac, north of Port Huron, where they passed the night.

Friday, July 18.—The aviators left Port Sanilac, Mich., flying down to Edison Beach, near Port Huron, in a heavy wind.

Starting away again at about 2.30 p. m. they completed the trip from Edison Beach to Detroit, a distance of 60 miles in 60 minutes.

W. E. Scripps, of Detroit, in a Burgess hydroaeroplane, met Havens and Verplanck in Lake St. Clair and escorted him into the city.

Havens and Verplanck are considered to have won the silver trophy offered by the Aero Club of Michigan for the best elapsed time between the two cities, there having been no other contender.

Photos of the Thomas and Martin machines appear in this issue. Details of the Vilas were in the June number. (See scale drawings in February.) Benoist boat described in January.

AUTOMOBILES AND AIRCRAFT IN GERMANY

The automobile industry enjoyed a most prosperous year, expansion along all lines surpassing that made during 1911. Foreign trade grew from $14,000,000 in 1911 to $21,000,000 in 1912, the increase manifesting itself principally in the exportation of passenger cars.

The aircraft industry, on the other hand, passed through a bad year and remains in a critical condition, owing to overproduction. The army and navy are practically the only customers and for various reasons they confine their purchases to as few types as possible, while new manufacturers, most of them with little capital, are constantly opening up shops for the development of new ideas and unduly increasing the field of production.—*Daily Consular Report.*

U. S. Patents Gone to Issue

Copies of any of These Patents may be Secured by Sending Five Cents in Coin to the Commissioner of Patents, Washington, D. C.

Even in these enlightened days, the crop of patents on absolutely worthless, or even questionable, devices increases rather than decreases.

It would take an entire issue of the magazine to abstract in a full and clear manner the claims of the majority of the patents issued. In a great many cases it is even impossible to give in a few lines what sort of an apparatus the patent relates to. In most instances we have used merely the word "aeroplane" or "helicopter" if such it is. Where it is impossible to indicate the class, even, in which the patent belongs, without printing the whole patent, we have used the word "flying machine."

The patents starred (*) are those which may be found of particular interest; but it must be understood we do not pretend to pass judgment upon merits or demerits.

Where patent seems to have particular interest, the date of filing will be given.—*Editor.*

Do not attempt to invent in a field the science and prior art of which are unknown to you—William Macomber.

ISSUED JUNE 17, 1913

1,064,872—David S. Thomas, North Platte, Neb., FLYING MACHINE.

1,065,033—Frederick William Dufwa, Mexico, Mex., Equilibrium Device, in which a swinging car operates various rudders.

1,065,216—Julius C. Christiansen, New York, N. Y., Universally operating STEERING MECHANISM.

1,065,263—Gustav Mees, Dusseldorf, Germany, STEERING and STABILIZING MECHANISM; shaft, spokes radiating therefrom, blades rotatable on spokes, outer and inner frame, flexible sheet, etc.

ISSUED JUNE 24, 1913

*1,065,389—Harry A. Orme, Wesley Heights, D. C., LANDING GEAR, of flexible design, in which wheels are capable of swinging outwardly for landing on skids, etc.

1,065,394—William Rabsilber, New York, N. Y., FLYING MACHINE consisting of tubular body, propellers and supporting planes therein.

*1,065,506—Louis Constantin, Paris, France. Reducing the Resistance of a Surface by means of a "screen" of appropriate section less than that of the midship section at an appropriate distance in front of a wing (or vehicle), screen constituted of several inclined walls parallel to each other and separated by vacant spaces, attachments connecting them, and connection of screen (or bow) to wing (or vehicle). See p. 219, June.

1,065,656—Paul Benni, Lublin, Russia, AUTOMATIC MEANS for STEERING and BALANCING. Pendulum and electro-magnetic system.

1,065,739—Ludwig Sommer, Munich, Germany, MAN POWER FLYING MACHINE.

*1,065,799—Ambroise Goupy, Paris, France, AEROPLANE, in which planes are "stepped" and may be moved forward or backward to the desired angle with relation to the longitudinal dimension of the frame.

ISSUED JULY 1, 1913

1,066,203—Richard Gilardone, Mutzig, Germany, AEROPLANE TRACK; amusement device.

1,066,346—Ernest Peter Vincent, Oceanic, N. J., AEROPLANE, in which supporting planes rotate.

ISSUED JULY 8, 1913.

*1,066,860—Edmund Sparmann, Vienna, Austria-Hungary. Filed Dec. 5, 1910. AUTOMATIC STABILIZER, both lateral and longitudinal. Uses gyroscopes whose axes of rotation are vertical but whose axes of oscillation are perpendicular to each other. The claims are too long to abstract here.

*1,066,981—Thomas W. Benoist, St. Louis, Mo. Filed July 1, 1912. CURVE changing mechanism in which the camber may be reduced and changed back to normal while in flight or otherwise, in which a third lateral (but sectional) beam is used and apparatus for altering the camber by flattening the ribs.

1,067,086—William James Wells and Daniel Lewis, Cananea, Mex., AIRSHIP.

ISSUED JULY 15, 1913

*1,067,271—Lewis Hector Ray, Ottawa, Ontario, Can., CONTROL FOR AEROPLANES; wheel on a column extending through a bell-shaped member, spindle below column with lever for rudder, universal joint connecting column with spindle, etc.

1,067,272—Arthur J. M. Recklin, Bay City, Mich., KITE.

1,067,425—Herbert E. Hawes, New York, N. Y., AEROPLANE.

*1,067,432—Charles Francis Jenkins, Washington, D. C., AILERON STABILITY and ELEVATING SYSTEM; usual ailerons between outer portions of wings, longitudinal central seat rod arranged to swing vertically and having oppositely projecting lateral arms, a rotary and sliding steering column arranged to actuate said vane in rotating, means whereby sliding said column compels variation in the elevation of the arm-bearing portion of said rod, and wires connecting the arms to the wings and compelling both to move in the direction of the movement of the arms.

1,067,466—Norman Clark and Albert E. Plank, Quincy, Ill., SURFACE. An aeroplane having a plane flat top surface and a convex-curved lower surface adjacent to the front edge and extending back beyond the middle of the body of the plane almost to its rear, and reversing into a concave surface adjacent to the rear, substantially as described.

1,067,559—Joseph A. Steinmetz, Philadelphia, Pa., PARACHUTE for an entire aeroplane.

TECHNICAL TALKS

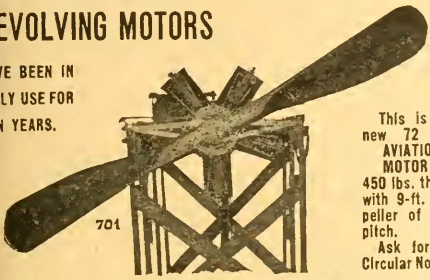
(Continued from page 7)

from that shown in figure 3 to that shown in figure 4 produced a marked improvement in flying qualities.

This is all very interesting and remarkable; but, until we can see the tabulated data giving K_x and K_y we can not form a definite conclusion as to the actual value of this improvement.

If the thickness of a wing is increased by changing the contour of its upper surface, both the lift and drift are increased. The use of a concave entering edge and the existence of head resistance in a complete aeroplane bring about that the ratio of lift to total horizontal resistance is not greater for a thick wing than for a thin one. Consequently with a wing of variable thickness we obtain an aeroplane of variable speed. This method is safer than changing the cambre of the wing, and simpler than changing the area.

M. B. Sellers.



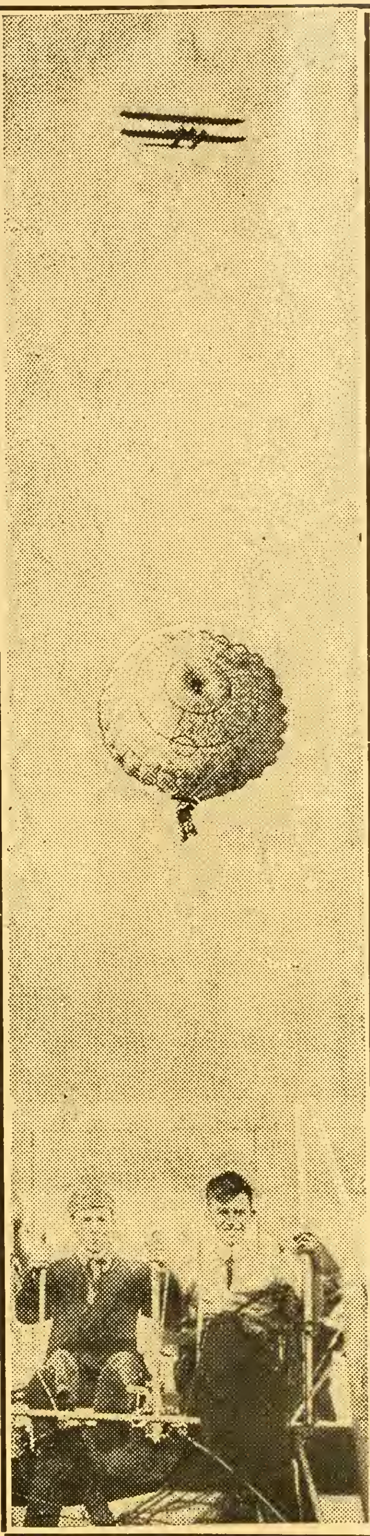
CHRISTOFFERSON FLYING BOAT

(*Continued from page 16*)

inches diameter. The center of the hollow chrome nickel steel propeller shaft is placed 14 inches below the rear main beam. The diameter of the shaft tapers from 2 inches at the propeller and gears to 1 foot 5 inches at the forward end. The radiator is at the rear of the motor and the 20 gallon gasoline and the oil tanks are located in the hull under the motor.

Wing floats are used at extremities of lower plane. These are torpedo shaped in vertical section, oval at front and flattened at the rear.

The control is of the Dep type.



Harry Bingham Brown

The Greatest of the Great

Especially engaged for the

Halifax Exposition

Halifax - - Nova Scotia

Assisted by

Law and Lapham

The Two

DARE-DEVILS OF THE SKY

under contract to perform the

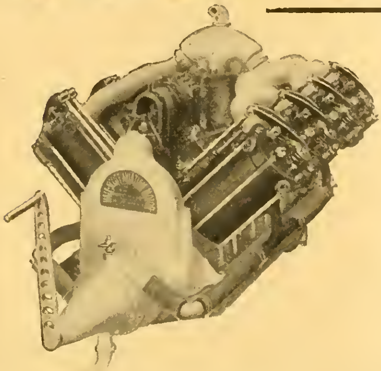
"Stevens Pack Act"

during the Season of 1913.

Managers of high standing that want something extraordinary will do well to address

A. Leo Stevens

Box 181, Madison Sq. N. Y. City



AERONAUTICS

XIII. No. 2 AUGUST, 1913 25 Cents


Are You Absolutely Sure of your Ignition?
THE achievements of the world's most notable gas engine designers have been made most effective thru their selection of the Bosch Magneto. You are assured perfect ignition when it's Bosch—you take no chances.
Literature sent on request
Bosch Magneto Company
201 W. 46th STREET :: NEW YORK

Developing New Ideas*

By GEORGE M. DYOTT

The title of this talk may seem rather dull; nevertheless, I feel sure that a great many of us set about development work in a way that is expensive and non-productive of results. So, if I can lay before you in a clear and concise manner the most logical method of approaching new problems the time may not be altogether wasted.

Time and time again I have witnessed individuals vainly endeavoring to exploit some new ideas, which, at the start, were fundamentally wrong. Had a little thought been brought to bear on the subject at the outset considerable time and money would have been saved.

There is a right way and a wrong way of doing everything in this world and I see no reason why aviation should be any exception to this rule. A few years ago, when there was very little authentic information published concerning aeronautics, the only method of procedure was to experiment and collect data upon which to work; but in these days, when the main principles are so well established there is no excuse for ignoring what others have already done *in the field*.

Before proceeding, I ought to first define just what I mean by a right and wrong way. Spending money and learning nothing, or spending time and money proving principles which are already known to be wrong, are wrong ways; the right way is that one which, for a minimum of time and money, produces definite concrete results.

The qualities necessary for success in development work are: good judgment and a logical, open mind coupled with a keen appreciation and respect for other people's ideas. Prejudice is fatal to the development of sound ideas.

The first stumbling block to avoid is ignorance of what is already known of the laws of mechanics irrespective of aeronautical ideas.

Let me illustrate the point at issue. A short time ago a man asked my advice concerning a pendulum stability device which he was about to finance. The inventor had constructed a model and from it was suspended a weight at the end of a cable. By a single throw of a lever this weight could be raised or lowered as desired. In the full sized machine, which was to be built, the pendulum would weigh 150 to 200 pounds and had to be raised 20 to 30 feet in two seconds. In order to accomplish this, it would require the expenditure of well over one horse power of energy. No matter what merit the device had, this one feature alone would make it worthless.

Before working on new ideas be sure you are familiar with the old ones. When a principle is once established there is no good in proving it all over again at the expense of time and money. Take a few lessons from those who have had experience and you will learn better and quicker. Take as an example the theory of low centre of gravity as an aid to stability. The position of the centre of gravity is now fairly well understood and yet we still find individuals placing it as low as possible; a little careful study would often help the novice in avoiding errors of this kind.

In carrying out new ideas it is essential that the reasoning in support of them should be logical, but still more important it is to see that the premises upon which the reasoning is based are true. The only way to be sure of this is to be thoroughly familiar with the subject in hand.

When I first started building machines I considered the Bleriot type of under carriage extremely dangerous for ground work. Hence, instead of making my wings light and flexible, I made them rigid and heavy. The advantage of this was apparent when I found my machine continually tipping over on a wing tip. So on every occasion I decried the Bleriot landing gear and wing construction, pointing out the superiority of my own ideas. All of this reasoning sounded well enough but later on when I actually went to the Bleriot school in France my astonishment knew no bounds when I discovered that it was almost impossible for one of their machines to lurch over on a wing tip. The reason was then apparent—it was the undercarriage, which a few months previously I told everyone was dangerous; actual experience proved it to be a marvel of ingenuity and necessitated a considerable rearrangement of my own ideas on the subject.

In developing a device we often overlook the fact that it must not only work to be successful but it must work better than other devices or have some point of superiority, whether it be low cost or simplicity which places it ahead of existing devices. As a business proposition today it is of little use to construct an aeroplane that merely flies—it must fly better than others or else navigate to better advantage. A tight rope walker once conceived the idea of running a wire from the roof of his house to the street below and over it he effected entrance and egress. His friends, however, still continued to use the staircase as it required less agility and was more reliable. This same line of reasoning applies to the development of aeronautical apparatus.

Some experimenters make originality the keynote of their designs; originality should not be overlooked, yet to strive for it to the exclusion of everything else is decidedly bad practice. I once saw a machine equipped with a very original shock absorbing device. Its weight was 35 pounds. On a Deperdussin monoplane the shock absorbers weigh three

* Lecture before The Aeronautical Society.

pounds and are just as efficient. The extra 32 pounds could have been well dispensed with and as a whole the machine would have been improved.

As most of you are interested in developing complete machines rather than the appliances let me say a few words on this subject. At first do not depart too far from the beaten path and be sure you know what constitutes a good flying machine before starting to build one. Without doubt, the money spent in going to a standard first class school is well invested; the pupil becomes familiar with the feel of the air and if under good instructors will learn principles of flight which he never can learn from books. When once he has passed his license tests, experience in flying other standard types of machines will prove interesting and valuable if development work is to be undertaken. The broader one is experienced the better is one able to judge the relative merits of different ideas.

Avoid many variable or unknown quantities wherever possible. The combination of unknown motor, propeller, machine and operator makes it exceedingly difficult to arrive at facts. If, for example, you wish to try a certain propeller, do so on a machine with which you are familiar and with an engine whose characteristics are well known; then, if the performance of the aeroplane as a whole is improved, it must be due to the propeller, providing that no other changes have been made. By such a process of elimination really interesting data can be procured.

I know a man who spent the entire summer building a machine in which he mounted a new motor with a propeller of an uncertain design. Everything about the machine was novel and when it refused to fly he never knew to what to attribute the failure. It is a deplorable fact that there are so many cases of a similar nature on record as such methods hinder rather than advance the cause of aviation.

SUBSEQUENT DEVELOPMENT.

I look for subsequent development of the aeroplane to take place along standard lines just the same way that the automobile or other industries have developed along paths which were more or less defined at the start. Evolution is always slow and new ideas never supplant old ones over night so that I do not expect anything very startling for some time to come. The helicopter, which is the dream of many inventors, will undoubtedly come with increased knowledge of aerial appliances, but I feel that it will be through a perfection of the present aeroplane rather than a new discovery relating to helicopters. Witness the extraordinary manner in which some of the modern machines climb and then compare the slow rate of ascents years ago. It certainly looks as if the logical outcome were to be a vertical rise with all facilities for moving in any horizontal direction.

As to automatic stability, here, again, we are logically forced to the conclusion that it is but a matter of time when it will be an actual fact; nevertheless, we must not overlook the fact that great advancement has been made along this line, particularly with wings which might be termed inherently stable. As it is impossible to design an automatic machine to do a piece of work until we can first do it manually, so, likewise, is it impossible for us to automatically control an aeroplane until we can do so first by hand under all conditions. It will probably be some time before we can thoroughly understand all the conditions which exist in the vast expanse of atmosphere which surrounds us.

THE FUTURE OF THE AEROPLANE.

One word as to the future of the aeroplane. Does it, in its present state, look like a commercial article? Fortunately for myself, I am one of those who is absolutely convinced that it has a future, and a great one. Admitting its many shortcomings and its present limitations, I still see a vast field of usefulness spreading out before me. Not as a weapon of war so much as a vehicle of peace. Granted that in the former capacity it will find wide application, but it is in the cause of peace where it will evidently play its greatest part. To send a thousand tons of coal to Albany one would naturally resort to river transport, a ton of valuable merchandise would go by freight train and an individual by express passenger service. In each successive step, the cost of transport increases and does so in certain proportion to the speed of travel. Had I to be in Albany at 3 P. M. and it was now 2.30 P. M. the air route would be employed if possible; did it take an aeroplane the same time as it did a steam train there would be no occasion to develop aerial transport, but if the latter offers a speed of transit hitherto unattainable by other means then there will be a demand for it irrespective of the cost. In other words, high speed travel is an essential feature of this age and generation, and anything which brings about this end is indispensable to civilization.

In conclusion I might say that the foregoing remarks apply to the development of ideas rather than the research work in unknown fields. Those engaged in research must always deal with the unknown and allow their imagination full play as it is only by tearing onesself away from the beaten path and preconceived ideas that new theories can be postulated. Work of this kind is always tedious and costly and those who engage in it simply blaze the trail for the more practical man to come in and pass judgment on the theories which have been evolved.

A man in Long Beach, Cal., "refused" the magazine at the post office after accepting it for a year after his subscription expired. Not receiving reply to notification of expiration, or to letters requesting payment, presumption was that the subscriber wished the magazine continued. However, he takes this round-about way of notification rather than come forward and say he cannot pay for the numbers he has had, or advise us on notification of expiration that he doesn't wish to continue. This is a cheap and underhanded way of obtaining a subscription for nothing.

Technical Talks

By the Technical Editor

Resistance of Solids and Wind Deflection

In my last talk I said that by initiating an inward deflection at the stern of a blunt ended body, the resistance of that portion could be diminished. This is illustrated by experiments of the National Physical Laboratory, made in water, on the model of a dirigible having a stern removable in sections. It was found that a portion having a diameter equal to four-fifths of the major section could be removed, without materially increasing the resistance. Tests with colored water showed that the portion truncated was replaced by a conical zone of dead water. The sloping sides of the truncated stern caused the fluid streams to converge as shown in Fig. 1.

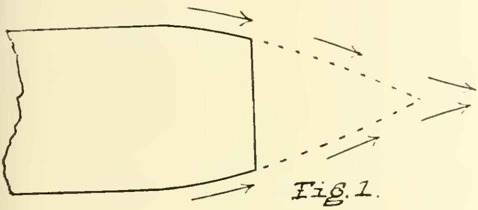


Fig. 1.

In connection with the subject of wind deflection, Dr. Cousin and M. Gingon have, in the Technique Aeronautique of Feb. 1, an article on the determinism of the form on the flight and speed of the bird. They quote from Mouillard the statement: "there are probably forms which give a counterpressure superior to the pressure"; meaning, thereby, that such a body, once started, would experience a resultant pressure forcing it forward. This is obviously absurd.

It is possible, however, to have a body on which the counter-pressure would equal the pressure; in which case only frictional resistance would remain.

I shall not attempt here to abstract this article, but shall give only the most salient points of the theory. Fig. 2 shows an out-

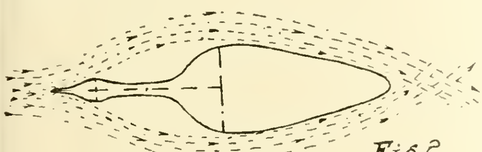


Fig. 2

line of a bird, seen from above, showing direction of air streams. It is seen that the bird's head forms a wind deflector shielding the front of the body from pressure, and deflecting the air streams in such a way that their convergence produces a pressure on the after-body.

These investigators point out that:

(1) There is an inverse ratio between the size of the head and the length of the neck.

(2) There is a direct ratio between the length of the neck and the major transverse diameter of the body.

(3) There is, therefore, a direct ratio between the size of the head and the diameter of the body.

The head and fore part of the body form a cone of penetration; and the after-body, a cone of utilization; the relation between these two cones being such, that the air streams deflected by the head shall return to produce a pressure on the whole after cone, and shall not return too soon or too late. Hence the necessary relation between the size and shape of the beak, head, neck and body.

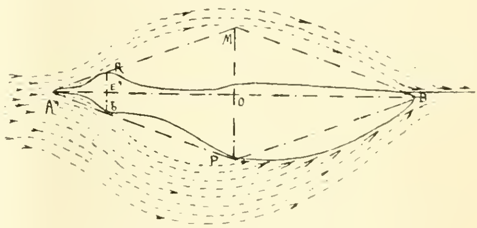


Fig. 3

Similarly, in Fig. 3, we have a side view of the bird showing that here the air streams deflected downward return to produce pressure (lift) on the under side of the after body; while those deflected upward produce a rarifaction (lift) over the whole upper surface.

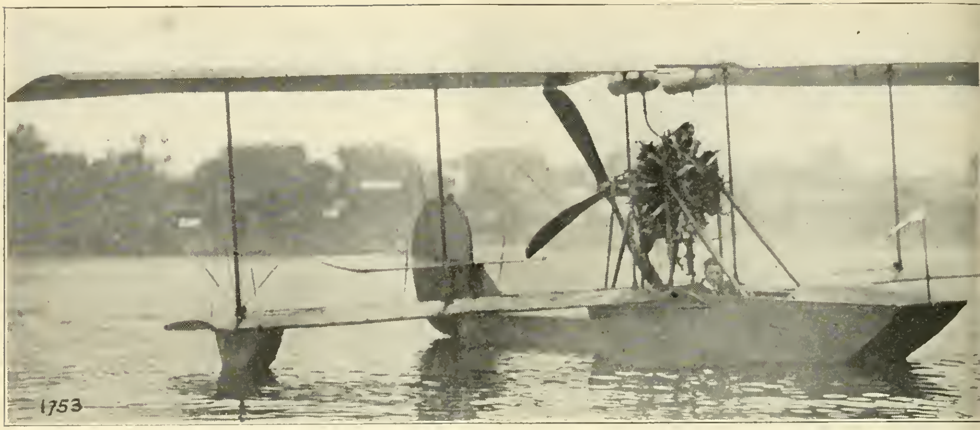
The authors go much further with their theory, showing how the direction of the air streams may be controlled by the lengthening of the neck and binding of the wings; besides, much more. But at present the important questions are:

(1) Does the bird's head act as a wind deflector, reducing the resistance of the body to forward motion; and,

(2) Can the air streams be deflected so as to converge on the after-body annulling the rarifaction generally occurring over that area?

As soon as I have opportunity I shall investigate these questions, using my wind-tunnel.

M. B. Sellers.



New Burgess Flying Boat

On July 19 the flying boat built for R. J. Collier and powered with a 220 H. P. Anzani motor was taken up by Frank Coffyn for the first time. It proved wonderfully fast on the water. After two short runs Coffyn took it a few feet into the air. He found that the speed far exceeded that which he had anticipated. It developed well over 75 miles per hour. This is especially surprising on account of the very large extra weight carried, the power plant complete weighing 968 pounds. On account of the difficulties in starting the motor by hand with a reducing gear a Hartford self-starter was installed and it is very pretty indeed to see Coffyn alongside the wharf press a button, when the Anzani motor immediately jumps into action and the big double propellers create a hurricane that well nigh sweeps one off his feet if he happens to be behind it.

On account of the very high speed and increased weight over the estimated weight, wing extensions were added to make the machine more easy to operate.

Late in the spring Collier placed an order with the Burgess Company and Curtis for a flying boat, and at the same time purchased a 220 H. P. 20-cylinder Anzani motor from the Anzani Company in France. It was specified that the flying boat should make a speed of at least 75 miles per hour, should carry a fuel capacity of about 4 hours flying and carry one or two passengers. Coffyn has taken contract to fly it for him.

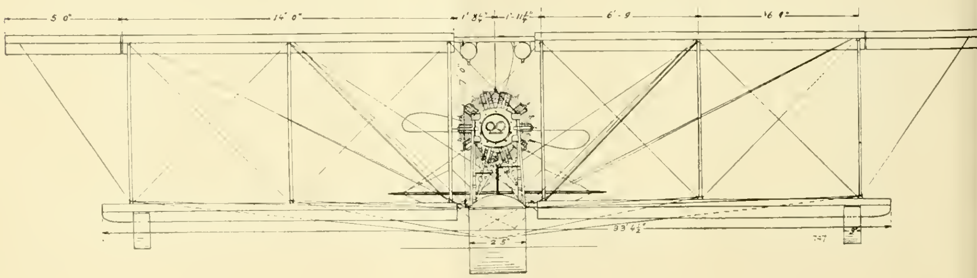
It will be noticed from the plans that th upper plane alone warps, the lower plane being rigid and are separated by a single lin of steel struts. This is a distinct departur in American design which gives a greate efficiency by a marked reduction of the hea resistance.

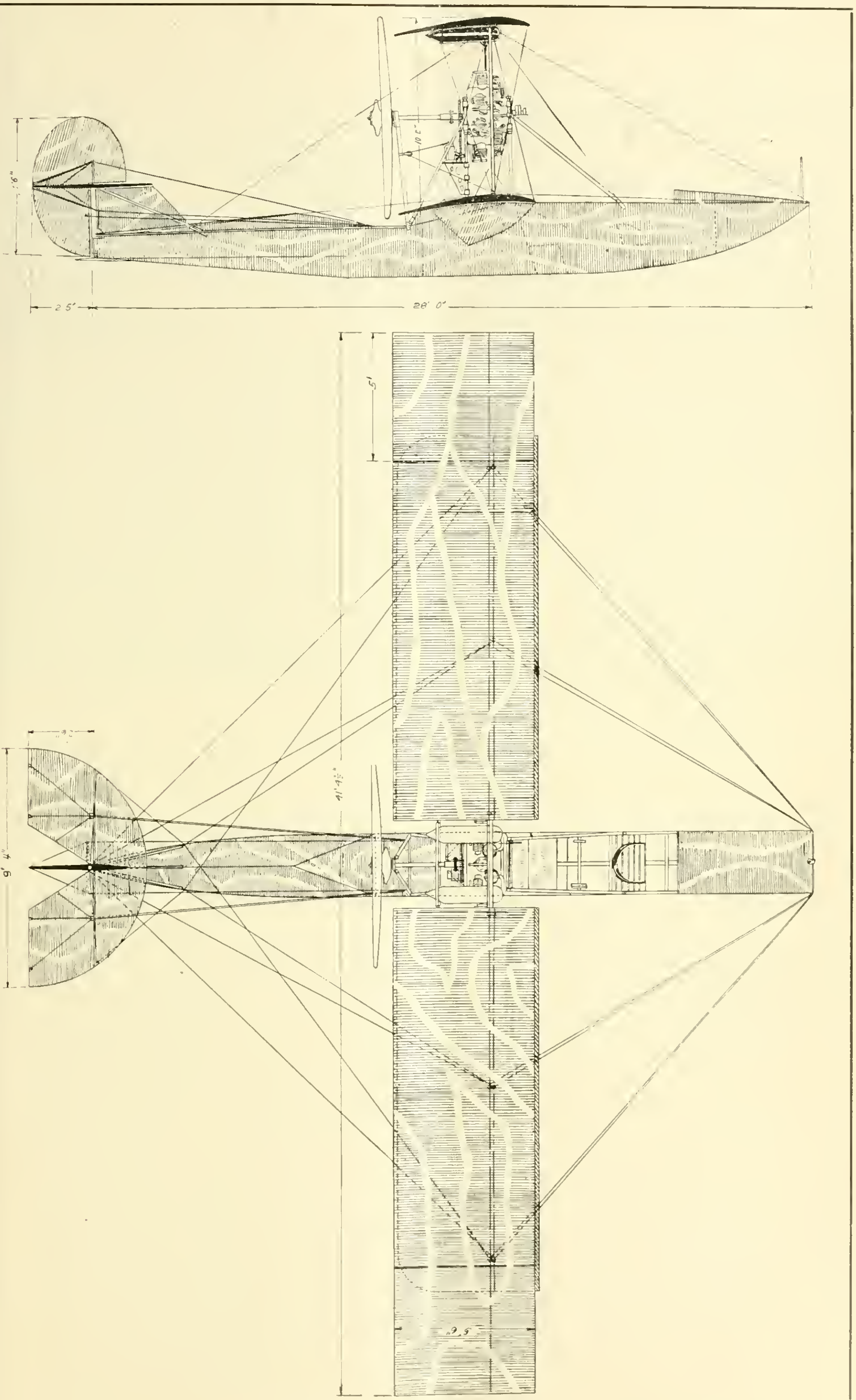
Each wing is built up on a tubular steel spa 3½ inches in diameter and with the tube stee vertical struts separating the main planes, th main cell is practically a steel skeleton. wood entering edge (hollowed out for lightness) and a wood stringer parallel to th wing spar serve to maintain the spacing o the ribs, which are of wood, placed ever twelve inches apart.

The upper surface is fitted with 5 foot extensions and has a span of 41 feet 4½ inches As the drawings show, it is made up in 4 sections. The lower plane measures 33 feet 4½ inches in span.

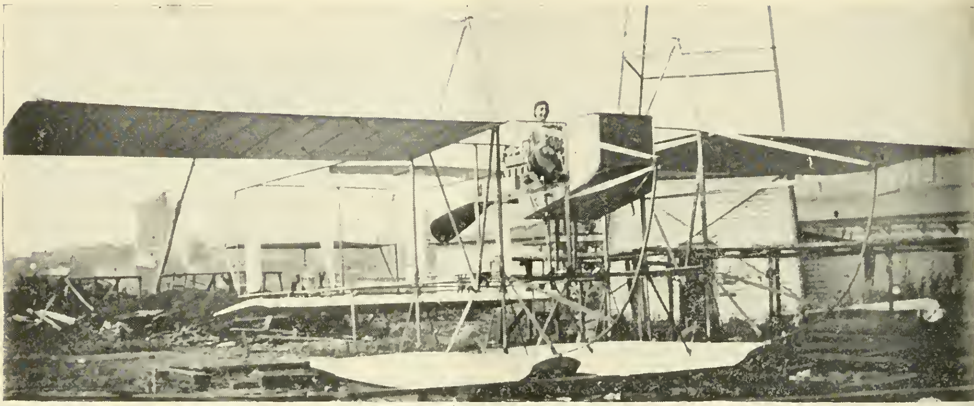
The 20-cylinder motor, with its cylinder arranged radially in staggered rows, drives four-bladed propeller direct through an extension of the crank-shaft, supported on ball bearings upon a tubular steel standard buil up from the hull. In this latest design it ha been possible to get the center of thrust ver near the center of resistance.

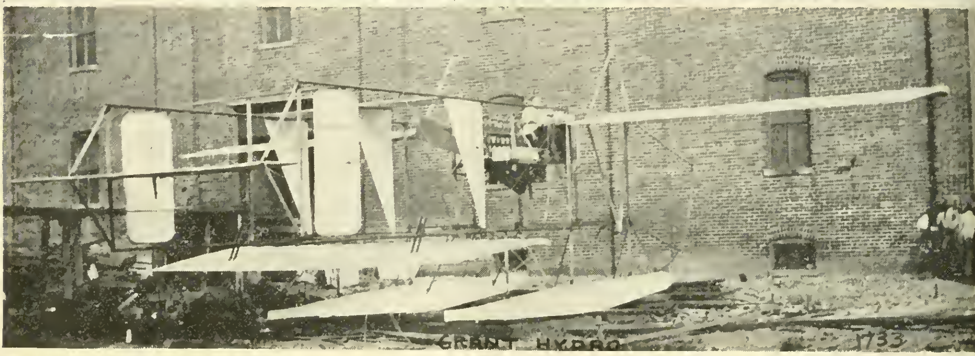
(*Continued on page 61*)





Burgess 220 H.P. Flying Boat





The Grant Monoplane

With Changeable Angle of Incidence

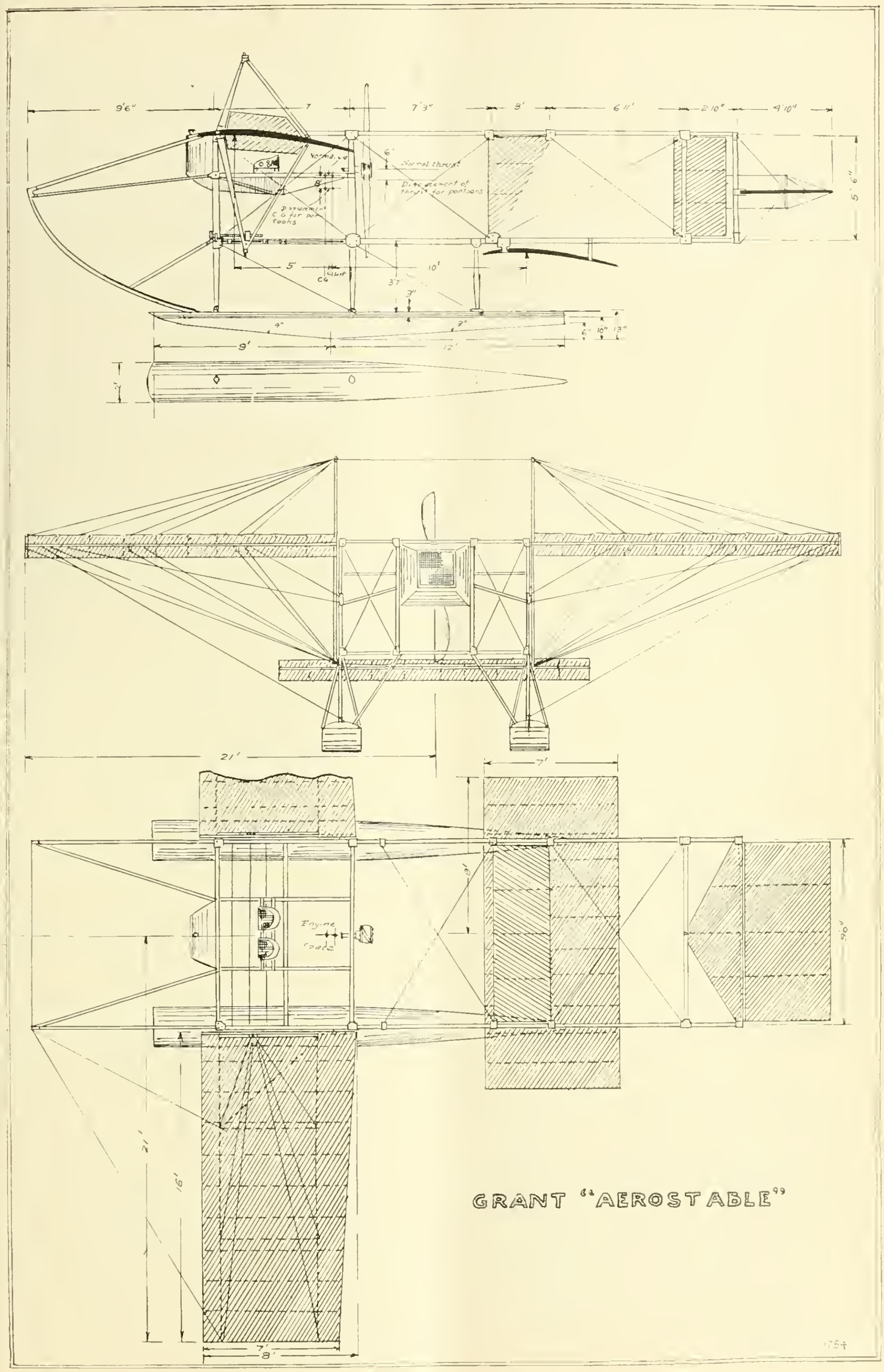
Mr. R. R. Grant, of Norfolk, Va., following out the same line of experiments made with his former machine at the old Jamestown Exposition grounds, has just finished a new tandem monoplane, a hydroaeroplane of the catamaran type, which, while embodying the same general principles of the old machine, has some interesting new features, one of which is a device whereby the angle of incidence is changed while in flight.

To accomplish this, a double movement, which maintains a constant lifting centre and adjusts the proper ratio between the forward and rear surface, is provided. The operator turns a small wheel located between the double seats when changing or adjusting for the proper angle.

Further, the surfaces are full Cissoid of Diocles form, this form having been adopted on account of its high efficiency and that for all change in angle the C. of P. movement travels at a constant ratio, *i. e.*, within reasonable angles of flight. With this curve a very much increased inherent stability has been obtained and, further, it functions perfectly with the tandem system, *i. e.*, the C. of P. variations are always in a corrective direction, thereby assisting in making the machine automatically stable.

From many experiments with the old machine in flight Mr. Grant found that the good effects of the negative angle in the rear plane of the tandem system is destroyed by the improper placement of the C. of G. These two physical elements being the secret of longitudinal stability and when coupled with the best form of surface the longitudinal stability can be considered as nearly perfect.

In the old machine after these features were incorporated the longitudinal stability could always be depended upon, and in no instance did it ever fail though many severe tests were made. A very fine technical description of the inherent longitudinal stability feature of the tandem system will be found in Captain W. Irving Chambers' article in AERONAUTICS for February, this year. Capt. Chambers states that the theory or object of the tandem system (referring to the Drzewiecki machine) is, "to so adjust the plane surface that when exterior perturbing forces disturb the equilibrium a dynamic couple is born which restores the equilibrium immediately and automatically." The same physical results take place in the tandem system with the small plane in the rear, provided, the C. of G. is properly placed, the centre of gravity must at all times become the axis centre around which the lifting and drift pressures converge, for in this type of ma-


9'6"
7'3"
3'
6'11"
2'10"
4'10"
5'6"
Normal thrust
Displacement of thrust for pontoons
5'
10'
9'
12'
21'
7'
8'
9'6"
16'
Engine
GRANT "AEROSTABLE"

chine no inertia pressures are necessary, for, as Capt. Chambers puts it, it is "Aerostable," *i. e.*, all corrections being the secondary result of the perturbating forces themselves. At the conclusion of three years' experiment in the field Mr. Grant corroborates the laboratory results of M. Eiffel on the tandem system but brings out the fact that whereas by a properly designed tandem system, longitudinal stability can be made practicly perfect and, therefore, lateral stability will be greatly increased, nevertheless, a perfect lateral system is necessary and he has developed one embodying the same inherent or automatic feature as the longitudinal, a system depending upon the secondary effect of the perturbing forces to bring about the necessary corrections. A full description of his lateral system will be found in AERONAUTICS of August, 1912.

The new machine's dimensions are: spread, 42 feet; length, over all, 41 feet; physical length, 32 feet; each main wing, 16 feet by 92 inches chord; camber, top, 6 inches, bottom 3½ inches; mean curvature, Cissoid of Diocles, or the curve giving the duplication of the cube; the surfaces are pivoted 11 inches back from the entering edge, the axis consisting of a 1¾ inch Shelby steel tube of 18 gauge which runs the entire length of the plane. All supports and stays converge along this axis centre. This scheme of support is so rigid that the machine can be lifted by the outer tip of the surface, although it weighs 1600 pounds.

The power plant consists of a 100 H. P. Emerson 2 cycle engine, which has been thoroughly rebuilt by Mr. Grant. This engine was used and its many defects located in the first machine and will be used during the tests of the present machine. The engine swings a 9.33 diameter, 6 feet pitch propeller of Mr. Grant's own make. The engine, if it proves satisfactory, will be equipped with a Delco starting system with a special Exide battery. The starting outfit weighs 160 pounds, and is all ready to be installed as soon as the engine has proven satisfactory, otherwise a new engine will be installed.

The El Arco radiator is placed in front of the operator, the operator's car being arranged automobile style. This arrangement has been adopted to centre the weight as much as possible, as well as to form a windshield and supply warm air to the occupants. The air can be deflected, if desired, by a shield forward of the seats.

The elevator and rudders have the same surface area, 30 square feet, and there is also 30 square feet in the damper wall; the damper wall can be adjusted for use with and without pontoons, as the machine is convertible.

The wing framework is constructed of white ash and Shelby steel tubing, covered with Goodrich Alumina cloth. The front lateral spar is of ash 1 inch by 1 inch, and the rear is a tube 1¼ inches by 1½ inches, 11 inches from front edge. Ribs are solid web I beam section glued and brass screwed, made of bass wood. For the rear 2 feet there is no web and the rib is flexible. A ⅜ inch brass tube forms the rear edge.

The control system is of the Curtiss principle, constructed of aluminum and brass tubing. The control wires are run in duplicate on both sides of the machine through the longitudinal steel tubes, and so arranged that one entire side may break without in the least affecting the control.

The surfaces are rigidly supported to the strut member and, while lateral equilibrium is controlled by the forward plane by a differential change in the angle of incidence, which works normally automatic, no warping or change in form of surface is made. The forward surface is normally 2 degrees higher than the rear, but ratio changes with angle of incidence.

The construction of this machine has been carefully calculated and all stresses and strains taken into consideration along the same line as if it were a bridge and a factor of safety of 50 to 1 has been obtained. All stays and guys are of Swedish steel wire and sockets and clips of steel. Total area of machine, 364 square feet.

The floats are of catamaran type, each 2 feet wide, 21 feet long. For the forward 9 feet the sides are parallel but from this point converge to a point at the stern. For the forward 9 feet the bottom slopes at an angle of 4 degrees to a depth of 13 inches, sloping up again aft at a reverse angle of 3 degrees. The decking of the float is crowned to a height of 3 inches and the bottom is curved transversely with a 2 inch camber. Each pontoon is divided into five water-tight compartments.

BOOKS RECEIVED

ALL THE WORLD'S AIRCRAFT 1913, by Fred T. Jane. Fifth issue of this book, a large cloth volume, which contains a list of the principal types of dirigibles and aeroplanes in all countries, with scale drawings and short table of dimensions and details with each; a section devoted to historical aeroplanes of the last six years; a department giving illustrations and details of all the world's engines; and, finally, an aeronautical "Who's Who" and directory. Published by Sampson Low, Marston & Co., Overy House, 100 Southwark St., London, S. E.

METEOROLOGISCHE AUSBILDUNG DES FLIEGERS, by Dr. Franz Linke. Cloth, 8vo., 70 pp., with 30 text illustrations, colored weather charts and tables. Published at Mk. 1.70, by R. Oldenbourg, Munchen, Germany.

DIE WAHRHEIT UNDER DEN STAND DER LUFTSCHIFFAHRT, 1913, by Victor Silberer, published by Verlag der Allgemeinen Sport-Zeitung, Vienna, Austria.

CAUSERIES TECHNIQUES, SANS FORMULES, SUR L'AEROPLANE, by Captaine du Genie Duchene, published by Librairie Aeronautique, 40 Rue de Seine, Paris, at 6 francs. 8vo., paper, 258 pp., with figures and charts, etc. Chapters include, Speed, Power, Propellers, Longitudinal Stability, Transverse Stability, Turning, Effects of Wind, etc. The Eiffel and other tables are given and attempt has been made to treat of aerodynamics in simple language. In French.

New Curtiss for Navy

The latest Curtiss flying boat, "U. S. N. C2," for the United States Navy completed its official tests on August 14 under the observation of Captain W. Irving Chambers, U. S. N., Lieut. H. C. Richardson, Naval Constructor, U. S. N., and Lieut. P. N. L. Bellinger, U. S. N. Most of the tests were made by moonlight the night before. This was done because the specifications demanded calm weather for certain trials.

In addition to an unusual equipment of instruments, about 300 pounds of oil and gasoline, the flying boat made the trial flights with a load of approximately 700 pounds. With this load an average of ten flights with and against the wind showed a mean speed of a fraction less than 60 miles per hour. Slow speed tests with the same load showed a mean of less than 50 miles per hour. Unofficially the same machine has shown a slow speed of less than 45 miles per hour, but the air was "bumpy" during the tests and it was not considered advisable to slow the flying boat to the limit. The gliding test proved a surprise, for with motor stopped at an altitude of four hundred feet the boat glided 2,800 feet before touching the water, and then was brought down purposely to avoid landing on the shore. With the load carried a gliding angle of not more than five to one had been expected.

Compared with the Curtiss flying boats the Navy has used during the past year the new machine seems very large. The hull has an extreme width of 50 inches, a depth of 46 inches, and a total weight of 500 pounds. Fully loaded for the tests the machine weighed approximately 2400 pounds.

"C-2" is a decided Vee-bottom, and her step is a deep Vee-shaped notch, the boat riding on the extremities of the branches of the V when at speed. Her sides are built up solid to the coaming and have a decided flare, so that her flotation increases with the load imposed. Instead of the collapsible windshield used on the earlier craft the sloping bow of the new boat is built up strongly and is solid except for the hinged panel in the centre which turns forward to form a gang-plank over the bow. Looked at from the bow the hull suggests a wedge, the resistance of which increases almost evenly on all four sides.

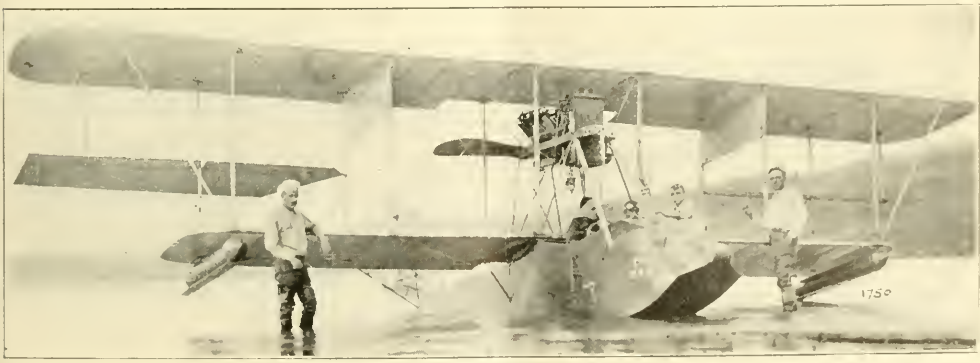
The equipment of the hull of "C-2" is very complete. Behind the seats in the hull is located a 40 gallon fuel tank, in addition to the tanks direct-connected with the power plant. At present it also has a gyroscopic stabilizer which operates both lateral and longitudinal controls. The instrument board is especially compact and shows at a glance conditions affecting every part of the machine. An air-pressure speed gauge shows very accurately the speed of the machine in still air or traveling across the wind. A shaft-speed indicator shows engine speeds at all times. An angle indicator, a barometer, an anemometer, a gasoline gauge, and a clock, are on the same board.

Above the hull are minor changes. The wings are built up one piece, with very substantial frames, with a spread of 39 feet for the upper plane, and 30 feet for the lower one. The chord is 66 inches and the gap 66 inches. They are covered with the toughest of unbleached linen, coated with some new "dope" which waterproofs them and at the same time renders them nearly transparent. The tail structure remains practically unchanged.

The power plant includes a rebuilt Model O Curtiss motor with Model O-X valve action, —practically an O-X complete, and developing 90-100 H. P.

From Chicago—"Enshrouded in smoke 4,000 feet in the air almost directly above the loop district, W. C. Robinson, a Chicago aviator, yesterday fought a desperate battle against death when a fuse blew out on his engine and flames ignited the wings of his monoplane. The aviator finally succeeded in quenching the fire with a small hand extinguisher which he carried on the machine and reached the aviation field at Cicero safely.

"Scores of members of the Aero Club of Illinois, watched the battle through field glasses."



A Comparison of Wind Tunnels

BY M. B. SELLERS

M. Raibouchinski, in the Bulletin of the Aerodynamic Laboratory of Koutchino, Part IV, gives an account of experiments to determine the comparative value of various types of wind tunnel.

A model of the Eiffel tunnel was made having a trunk or nozzle 60 cm. in diameter; this was compared with the Koutchino tunnel, with reference to the variation in air speed and pressure due to the variation in size of the bodies under experiment.

For this purpose discs of different sizes were mounted on the balance normal to the current. The air speed in the Eiffel tunnel was measured in the nozzle. Taking for comparison the ratio of the diameter of the disc to that of the tunnel, it was found that the air speed in both tunnels diminished with increasing size of discs, but for discs of small diameter ratio, the variation was less for the Koutchino tunnel.

The unit pressure on a disc *decreased* with increasing size, in the Eiffel tunnel; whereas in the Koutchino tunnel, it *increased*.

But, for small discs, the variation in the Koutchino tunnel was very small, while in the Eiffel tunnel it was much greater.

Therefore, so long as the dimensions of the objects of experiment are kept within proper limits, the variations in air speed and unit pressure are small in the Koutchino tunnel, and M. Raibouchinski concludes that it is superior to the Eiffel tunnel for that reason.

The pressure in the Eiffel tunnel *decreases* because the cylinder of air is expanded by the obstruction offered by the disc, its velocity diminished and the rarifaction on back of disc reduced. In the Koutchino tunnel it is *increasvd* because the obstruction causes a local increase of air speed increasing the rarifaction on the back of the disc. The Rateau and similar tunnels are open to the same objection as the Eiffel tunnel, but in a greater degree.

M. Eiffel and M. Flopp have recently found, for square plates, a maximum pressure, very pronounced near 40 degrees inclination, while observations made before 1910, by a number of investigators, showed no similar condition. M. Rateau, Prof. Prandtl and Prof. Mallock have found that between 30 degrees and 40 degrees inclination of a plate, the pressure was subject to more or less rapid fluctuations, and they attributed this to different types of eddies formed behind the plate.

M. Raibouchinski, with his large tunnel, found no greater fluctuation between 30 degrees and 40 degrees than at other angles; and no similar maximum at 40 degrees. In order, therefore, to determine if possible the reason for the difference, he constructed a small Prandtl tunnel (which is a closed circuit tunnel) 60 by 60 cm.; and in order to produce less interference with the air flow around the plate, the rod, which usually supports the plate at its edge, was bent around so as to support the plate at its middle. With this support the same pressure fluctuations and maximum were found, as described by Prof. Prandtl, but with the usual support they were not found. On removing all the return portion of the Prandtl tunnel these conditions were not found with either support.

M. Raibouchinski concludes that the current in the Prandtl tunnel is steadier, and consequently the eddies or vortices are longer preserved, thus provoking the rapid rise in pressure at the critical angle.

BOOKS RECEIVED

MECHANISCHE GRUNDLAGEN DES FLUGZEUGBAUES, by A. Baumann. Published in two parts by R. Oldenbourg, Gluckstrasse 8, Munchen, Germany. Fully illustrated with drawings and tables. Each part sells at 4 Mk.—Das vorstehend angegebene Werk stellt einen Niederschlag nicht nur der theoretischen, sondern auch der praktischen Arbeit des Verfassers auf dem vorliegenden Gebiete dar. Es behandelt, ohne auf irgendwelche speziellen Konstruktionen näher einzugehen, diejenigen Fragen und mechanischen Probleme, welch für alle Flugzeug gattungen von gleich groser Bedeutung sind. Um das Verständnis und die Verarbeitung des Stoffes zu erleichtern, wird der Leser, von den denkbar einfachsten Fällen ausgehend, schrittweise mit den komplizierten Problemen vertraut gemacht. Es werden so nach und nach alle Fragen behandelt, die für die Berechnung und den Bau von Flugzeugen von Wichtigkeit sind und gleichzeitig der Grund gelegt für das Verständnis des noch folgenden Bandes, der sich mit den Stabilitätsfragen befassen wird. Nach einer kurzen allgemein gehaltenen Besprechung des Luftwiderstandgesetzes gibt der Verfasser neue, mit seinen Versuchen und praktischen Ergebnissen übereinstimmende, einfache Formeln, auf Grund deren die Berechnung des Auf- und Rücktriebes von Tragflächen ermöglicht wird.

BAU UND BETRIEB VON PRALL-LUFTSCHIFFE, Part II, by Richard Basenach, 117 pp., cloth, with 80 illustrations. Published at 3 Mk. each part by R. Oldenbourg, Munchen, Germany.

THE GAS ENGINE HANDBOOK, by E. W. Roberts, M. E., seventh edition, rewritten and enlarged. Pocket size, flexible leather binding, 313 pp. freely illustrated; published by Gas Engine Publishing Co., Cincinnati, O., at $2. The book has been written as an epitome of gas engine practice and as a handy book of reference. All the matter is simply written and no one could be said to be an expert on gas engines without having the knowledge sold in this book. All knowledge must be bought somehow. There is a chapter on the design of aeroplane motors in which there is given a few simple rules for the design of engines of the light weight required in this service. The chapter deals with an up-to-date subject in a concise manner. While the author does not go into minute details on this subject as much as might be desired, it is touched upon in the chapters on the design of details.

MODEL FYING MACHINES, by A. P. Morgan. Paper, 16mo., 70 pp., fully illustrated. Published by Cole & Morgan, Newark, N. J., at 25 cents. A handbook on model flying machines, with full instructions as to making, scale drawings of various models, etc. Indispensable to the novice.

New Developments in Aeronautics

IT WAS FLY TIME

An aviator flew into
A garden where he found
A pretty maiden, bashful, too—
And so—he "stuck around!"

Indeed, this flyer chap pursued
His wooing with a vim,
For this coy maiden whom he wooed
Had made a hit with him.

And so he formed a plan to gain
This maiden, oh, so shy;
Said he: "Let's take my aeroplane
And spoon up in the sky!"

The maid demurely hung her head;
A plan she also had:
"I'll tell you what let's do instead—
Let's go and see my dad.

My daddy always loves to meet
You chaps who aviate;
You see, he has a special treat
He likes to demonstrate.

For daddy now and then invents.
The latest thing he's done
Is what he calls the 'Home Defence
Electric Airship Gun.'

You see, they live when they go up:
When they come down—they're dead!
And, ——"
The flyer chap had fled!

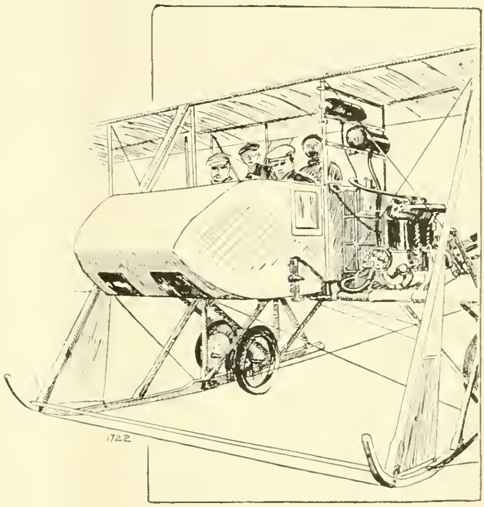
"And did your caller fly, my dear?"
Asked father, with a whoop;
And daughter answered with a cheer:
"You bet! He flew the coop!"

HAZEN CONKLIN.

LATEST GERMAN WRIGHT

new, much improved, military aeroplane the Wright type has now been produced the German army. The new flying mane, in contrast with the old model, which ried only two people, provides room for r and, if necessary, five persons. For this pose the machine has been fitted with a my fuselage, which offers a comfort and tection against the wind. Windows have n built in the floor, through which the ot may see downward or throw projectiles. carrying capacity of about 400 kg. (880) and superior climbing ability have been ined. The construction of the supporting nes is in the main the same as in the nor- l Wright machine. The steering gear has n arranged according to the regulations of army board; consequently, pilots used to er types will have no particular difficulty steering this new Wright type.

The measurements of the machine are as follows: The span of the main planes is 13.5 m. (44 ft., 4 in.) from tip to tip, the planes are 1.8 m. (5 ft., 11 ins.). The area of supporting surface is 42 sq. meters (approx., 463 sq. ft.). The distance between planes is 1.6 m. (5 ft., 3 in.). Length from front to rear is only 9.65 m. (31 ft., 8 in.). The motor develops 100 H. P. at 1,350 revolutions. A specially constructed transmission reduces the revolutions of the propellers, which are 2.6 m. (8 ft., 6 in.) long, to 810 as compared to the revolutions of the motor.



In this way the machine attains a speed of about 90 kilos. (approx. 56 miles) an hour. Its weight is 750 kg. (1,635 lbs.), the carrying capacity, including fuel, etc., 400 kg. (882 lbs.). The machine fully loaded needs, for starting or landing, a space of only 60 to 80 meters (197 to 262 ft.) in length.

HALL-SCOTT ENGINE TEST

Besides testing the new 100 H. P. Hall-Scott motor on a dynamometer, it was put on a test stand under propeller load and it gave a pitch speed of 10,500 feet per minute with a 7 foot pitch propeller. The thrust was 550 lbs. This shows a low thrust but is explained by the fact that a high pitch blade was used, being cut down until the required R. P. M. were obtained. This would show an estimated horsepower of 175, which is incorrect as the same engine tested on a dynamometer gave 120 H. P. at the same R. P. M. This is stated by R. S. Scott, of the company, to prove that horsepower cannot be correctly estimated by using the formula pitch speed x R. P. M. x thrust, divided by 33,000.

NAVY TRIES STANDARD CONTROL

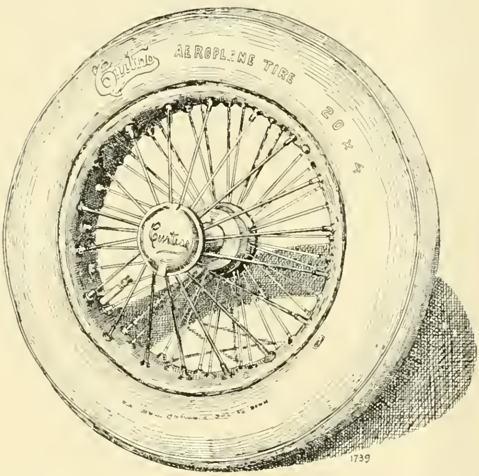
The U. S. Navy will be the first military, or civil body in the world to adopt a standard method of control. The necessity for this has previously been announced in this magazine.

A temporary conclusion has been arrived at by theoretical analysis, and Captain Chambers intends to put this in each of a Wright and Curtiss machine in one seat but hooked up to the old control so that either aviator can work it.

This will be tested, as well as all other systems and modifications on a land machine that is being rigged up, whereby each aviator can be tried with each system and the fatigue, smoothness and all other results can be recorded chronographically and compared. The final result will be fitted in all machines on one side of the double system and when all aviators are proficient the old controls will be replaced entirely. The aviators themselves are at last stirred up to desiring the change, but, of course, are not unanimous as to recommendations.

HEAVY DUTY CURTISS WHEEL

A new wheel for heavy duty has been marketed by Curtiss. There are 108 spokes 11 gauge, set in a double row on the inside and in a single row on the outside; the rim is of pressed steel, swedge countersunk for



nipples; steel hub offset 2 inches, screw dust cap; shaft diameter 1 inch, adjustable cones on shaft held by lock washers and nut. Size 20 inches by 4 inches, straight clincher; weight, with tire and inner tube, 17 pounds.

WILSON STABILITY DEVICE

After patenting in many countries an automatic lateral stability device, John W. Wilson announces the marketing of it in the advertising pages of this issue. Referring to th system, Mr. Wilson states:

"My device and its method of applicatio is absolutely new, and has never, to m knowledge, been attempted by any builder c flying machines of any type, and constitute in my opinion, the first step towards re flight, as I hope to be able to show by son of my more recent applications for patent I have long realized that an aeroplane, lik a bird, is an effect, a single track vehicl calling for absolute alignment, and that no time should the centre of pressure be s altered as to constitute a drag for the purpo of restoring lateral balance. It is well know that the systems of ailerons and wing warpir are both ineffective unless the aeroplane mai tains a forward motion, and once stalled the air, there is always grave danger th the aeroplane may never again be righte My device, depending upon no drag of ar kind, allows of an instant change of suppo by the turning of the entire supporting plan the banking side of the plane moving on a axis oblique to the perpendicular forward, u ward and inward, while the opposite side mov backward, downward and inward, and at tl same time the weight-carrying body havi thus been thrown out of line, automatical adjusts itself back into line. This rearrang ment of the four incidences—support, pre sure, gravity and thrust,—is accomplish without the use of either vertical or horizont rudders, without either ailerons or wing war ing, without changing the centre of pressu or slacking speed, a combination of adva tages which also allows of slower speed lan ings, owing to the instant readjustment of tl centre of support, and aids in reducing tl dangers of aeroplaning to a minimum."

WRIGHT INCIDENCE INDICATOR

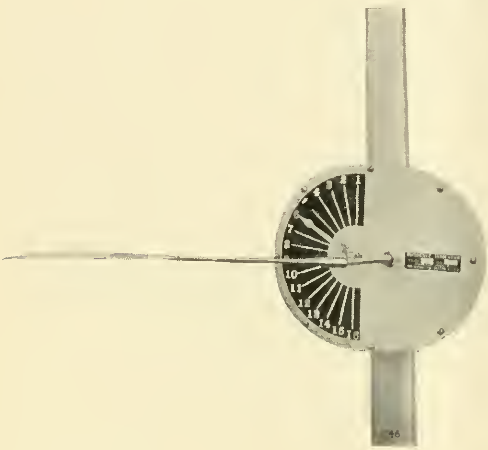
A new instrument for the use of aviators now marketed by The Wright Company. Tl use of an instrument showing angles of i cidence in the air, so that a pilot, who know his machine's limiting range of angles, cou be sure of remaining within safe flying pos tions, would save a good many lives.

On climbing, if the machine is set at to great an angle, the lift falls off, the drift i creases, and the machine first begins to sir and then in losing headway to "stall." I diving, if the angle is made too small, tl centre of pressure moves very far back, ar the degree of safety is greatly reduced l its proximity to a position of down pressu on the top of the wing; there is also tl possibility in again turning up of receiving pressure on the under-side of the tail surfac which would prevent the machine's recove ing from the dive. There are many no who consider this the principal cause c diving accidents that have taken place.

If in climbing, diving or in normal flyi the air currents are disturbed, rising, descen ing or deflecting from side to side, the ang of the machine with the horizontal, which registered by the ordinary gravity clinomete

does not represent the angle of the planes to the air. This latter, however, is the important thing to know, and, as no such instrument was on the market, The Wright Company proceeded to turn out one of their own, which has recently come into extended use in Government service.

In ascending or descending currents, to fly properly balanced, the machine may take an angle quite out of proportion to the horizontal, but with this incidence indicator, the pilot is positive that the planes are receiving their proper pressure, and that the centre of support has the correct relation with regard to the centre of weight. It is safe to say that keeping within the range of safe flying angles would eliminate almost 80 per cent. of the accidents.



As may be seen from the illustration, the Wright Incidence Indicator consists of a light air vane, which operates a pointer on a dial by a special mechanical contrivance eliminating any gravity influence. The pointer indicates at any time the angle of the chord of the planes with respect to the air currents through which the machine is flying, and, as already stated, is entirely independent of gravity in distinction to the usual clinometer, which takes no account of ascending or descending currents. The weight of this instrument is 2¼ lbs., and the dial can be read clearly at a distance of 10 feet. It can be fitted to any type of biplane on a convenient strut, and on a monoplane can readily be fitted to one of the cabanes, or to some member of the chassis. It sells for fifty dollars.

GERMAN ARMY SPECIFICATIONS

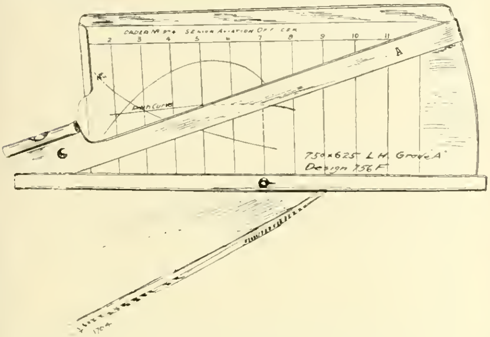
The Aeronautical Department of the German Army has promulgated standard specifications applicable to all aeroplanes purchased during 1913 for military purposes. In substance they are as follows:

German materials and products must be exclusively employed in the construction of t aeroplanes. They must be insusceptible weather influences and all parts must easily interchangeable. They must be bu so as to be readily assembled and demount into sections which can be easily loaded railway cars or road vehicles. Assemblin must not take more than two hours nor d mounting more than one hour nor requi the assistance of more than five persons. Wi a view to transportation the greatest wid must not exceed 14.5 meters (47.6 feet); t length over-all, 12 meters (39.4 feet); ar the height, 3.5 meters (11.5 feet). Motors more than 100 H. P. are not to be used exce with the special approval of the milita authorities. Other things being equal, prefe ence will be given to machines equipped wi low-powered motors. It must be possible start the motor from the pilot's seat. positive speed of at least 90 kilometers (miles) an hour is required. Moreover, must be possible in every case to reduce t speed during a flight to 75 kilometers (4(miles) and still fly forward on a horizont line. Provision must be made for carryin fuel, oil, etc., sufficient for four hour's ru ning. The fuel supply must be placed so to afford absolutely no danger to the cre There must be some device provided f thoroughly suppressing the noise of the mote A machine loaded not only with fuel, oil, et for four hours and with instruments ar tools but also with a further load of at lea 200 kilograms (441 lbs.), in which the weig of the pilot and observer is included, mu be capable of leaving the ground after a ru of not more than one hundred meters (3 feet); of attaining within 15 minutes an al tude of at least 800 meters (2625 feet) ar of coming to a standstill after landing even ground within a distance of 70 mete (220 feet). The machine must also be capab of rising from rough ground and landin thereon. It must further be possible to lan by gliding with motor shut off from a heig of 500 meters (1640 feet) making eith right or left-hand curves. Comfortable a commodations must be provided for pilot ar observer with protection from the wind. Th body must afford sufficient room for the in stallation of a bomb-throwing device, fo the storing of bombs and for photographin The instruments, including barometer, baro graph, compass, tachometer and stop-watc must be arranged so as to be readily ob servable. It must further be possible for th pilot to watch the stand of fuel and oil flight. There must be easy communicatio between him and the observer. The steerin apparatus must work as easily as possibl Automatic stability is a great desideratum.

Among the "millionaire sportsmen" purchase (that seems to be the popular title for any purchas of a flying boat) who are being instructed in th operation of the new Curtiss flying boats, are Georg U. von Utassy of New York, William Thaw, Willia E. Scripps of Detroit, Gerald Hanley of Providenc Barton L. Peck of Detroit, and Steve MacGordon.

HEATH PROPELLER PITCH METER

Spencer Heath, who makes "Paragon" propellers, carries with him wherever he goes, a curious instrument which he made several years ago for the purpose of measuring the pitch of aeroplane propellers. The instrument is a direct reading or direct recording pitch meter. It shows the pitch of any part of a propeller blade upon which it is laid, just like reading the time of day from a watch. In the manufacture of propellers it is considered indispensable for reliable work.



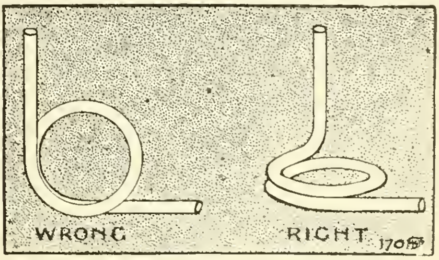
The main body of the instrument is an aluminum plate about twelve inches long and nearly half as wide. A card covering the greater portion of the plate registers in a groove at the bottom and at the side and is held by a clasp. This card is marked with vertical divisions to correspond with each half foot of blade radius, indicating each foot of diameter. A protractor arm, or blade, is pivoted near the left end of the plate so that the blade will swing upward across the card. A spirit level carried on the pivoted end of the blade shows when it is in a level position.

To use the instrument, the propeller is placed with its axis vertical and the flat or concave sides of the blades up. The blades are chalked off in half-foot spaces from the center out. The bottom edge of the pitch meter is laid across the blade at one of the chalkings. This gives the instrument the same inclination as the angle of the propeller blade, but the protractor arm is brought up to the level position and a short line or prick mark is made where its edge intersects the corresponding division on the card. By repeating at various division points along the propeller blade a series of marks or intersections is obtained, the height of which from the base line of the instrument indicates the exact pitch of the propeller for each division point. Connecting these points by a smooth line gives the pitch curve, or "graph," of the propeller blade measured. If the blade is a true screw of uniform pitch from hub to tip, the "graph" will be a straight line parallel with the base of the instrument. "Very few blades," says Mr. Heath, "are found to possess the pitch characteristic, although some of them apparently were so intended. In some propellers, the Curtiss, for example, there is a decided upward trend to the curve, showing a rapid increase of pitch out to the tips of the blades. In others, the Chauviere, say, the pitch is high near the hub and rapidly diminishing towards the end and then, in most cases, suddenly going up a little at the tip."

In the construction the graph card is made as part of the design and the propeller built accordingly, with the pitch at every point exactly corresponding with the angle formed by the protractor arm.

TO AVOID GAS LINE TROUBLES

Many are the aero motor stoppages caused by a leaking gas line. If the pipe is not chafed the trouble usually lies in a break through vibration. Copper pipe should be annealed by heating red hot and cooling rapidly in cold water to make it soft and pliable. One or two spiral turns will give the pipe a springy action that absorbs vibrations. The coil should lie in a horizontal plane to



prevent the collection of sediment or air locks. The bending should be done around a pipe held in a vise. The illustration from *The Car* shows the proper method of making the coil. If the motor chokes on opening the throttle wide but runs smoothly partially open, the trouble is due to dirt in the carburetor or lint in the feed line. Disconnect at the carburetor; if the gas flows free, look in the carburetor.

MORE POWER—EASY STARTING

The motor starts easier and runs smoothly at slow speed if the mixture is slightly rich. The admission of extra air in the manifold above the carburetor will speed up the engine, produce more power and reduce likelihood of carbon deposits. A hole may be drilled in the intake pipe and threaded. Fit a coupling in the pipe and a petcock at the other end, or screw a petcock directly in the manifold, after drilling out to a larger diameter the hole through the petcock. A spring pulling one way on the lever of the petcock will keep it closed and preserve the set mixture. A Bowden wire or cable to a sector at the operator's hand will pull the petcock open the desired amount. After starting the run, the petcock may be opened to obtain the increased engine speed. Priming may be done through the petcock in starting the cold engine. The same system may be employed for cleaning the engine with kerosene. A rubber tube with one end slipped over the petcock and the other in a can of kerosene, the petcock then opened, the kerosene will be rapidly sucked up through the motor and the carbon softened up and blown out. As the motor slows down, shut off the cock till it picks up again and repeat.

Sopwith Biplanes

T. O. M. Sopwith, whose flights in America will be easily remembered, is now one of the foremost constructors in England. A number of models are being putout of the tractor type in addition to the "bat boat," and propeller machine.

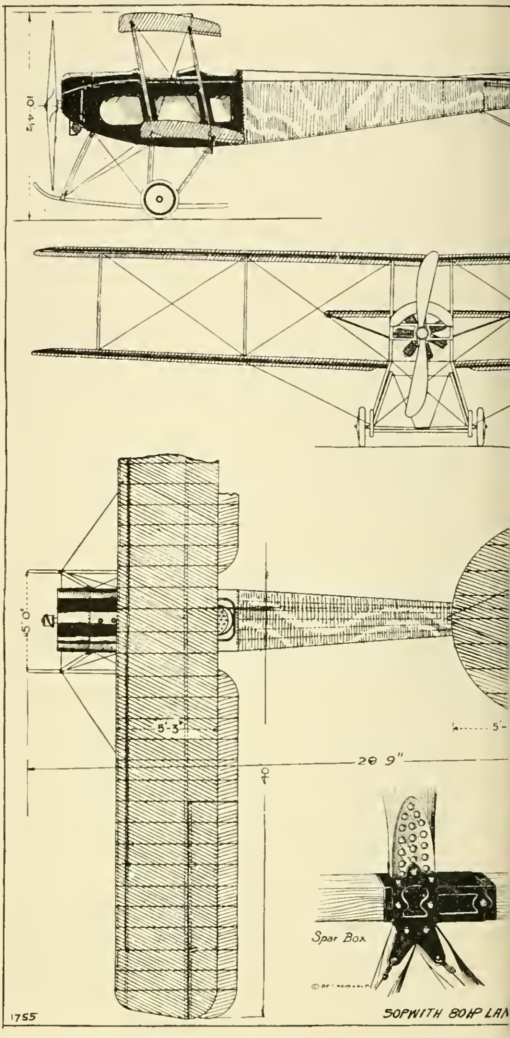
Both the land and water machines are of the tractor type, with planes staggered. In the 80 H. P. Gnome land machine accommodation is made for two passengers to be seated side by side in addition to the pilot, all three having an excellent view. Only the head of a person of average size protrudes from the covered-in fuselage, ample protection being afforded in consequence. The wing section seems to be the outcome of practical experience on a number of machines fitted with planes of various cambers. In normal flight this plane-section flies the machine at an angle of incidence of between 1¾ degrees and 2 degrees.

Balanced ailerons take the place of the warping wings. Wing sections, can, it is claimed, in consequence of the use of ailerons, be built considerably stronger—not only this, but another addition is employed to increase the strength of the wings, in the shape of a number of rectangular distance-pieces between the front and rear spars at each point where the interplane struts are attached. These relieve the various ribs of compression strains. The four tips of the main planes, and the outer extremities of each member of the tailplanes, consist of steel tubing. Attachment of the fabric is effected by sewing, the "bag" thus formed being slipped on afterwards.

With regard to the hydro-aeroplanes, three different types are under construction, apart from the "bat-boat," which has temporarily been put aside in order to permit the construction of less original types.

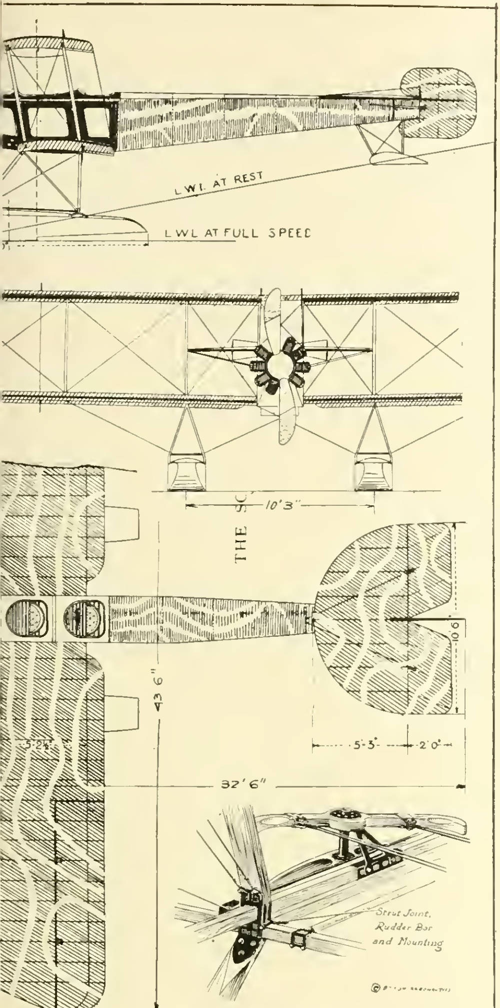
Two main floats fitted with spring suspension are fitted in addition to a single tail-float. A 100 H. P. Anzani drives a propeller of approximately 9 feet diameter, covered with thin copper to prevent splintering on the waves. The span of the top plane is approximately 56 feet; the floats are widely spaced, 10 feet 3 inches apart. There is, in consequence, no necessity for wing-tip floats. The main ones are mounted on inverted V-struts. As in all the other models, balanced ailerons are fitted, these being of considerable dimensions. Current for wireless is provided by a dynamo driven by chain from the starting-shaft at a rotational speed of 3,400 R. P. M., there being a metal-to-metal cone-clutch to disengage the magneto when necessary. Pressure is maintained in the petrol tanks by means of the usual air-fan and pump. The plane section is the same as that employed in the land-tractor, though the machine flies with its main planes at an angle of incidence of about 4 degrees.

Each float is covered with thin Holland blind union, which is glued on and varnished,



and through which the wood can clearly be seen. Three inspection covers are fitted, the interior edges of the interstices for which are padded in order to render them watertight. The hull is built up in two ⅛ inch thicknesses of cedar, the first skin being diagonally built up with 4 inch strips, while the outer is composed of similar strips running longitudinally. In addition to the outer layer of fabric, another one is placed between the two layers of wood. The interior is coated with black varnish—a suitable combination of gas-tar and naphtha.

The floats on the particular model in question are fitted with laminated steel springs. Four of these springs are attached to each float, the extremities of the front one being rigidly fastened to clips screwed onto a 1 inch by 1½ inch vertical strut within the hull. The rear spring, on the other hand, is free to



SOPWITH HYDRO

move. The apex of the front spring is connected to that of the rear by means of a radius rod. There are, of course, two of these—one on each side of the float. The only result of the flattening out of the front spring is to slide the rear one backwards, the enormous compressive stresses which would otherwise arise on that portion of the float between them being, in consequence, avoided.

The bottoms of the floats are convex, with a camber of 1⅓ inch. The bottom consists in part of a number of "ribbons," or minor longitudinals. Those running along the bottom of the rear half of the float are continued past the step until they die off where they meet, and where they are attached to, the ribbons from the bow. These are themselves continued to the upright portion of the step, on which they abut, the consequence being that triangular girder is formed.

NEW BURGESS FLYING BOAT

(*Continued from page 48.*)

Gasoline and oil are supplied from tanks above the motor, they, in turn, being filled from the larger tanks placed in the hull.

The hull of the new boat presents some refinements over the last type, though in general its design is much like the other. A higher free-board, however, adds to the comfort of the occupants when negotiating rough water. The hull proper is 2 feet 5 inches wide from the front to slightly aft of the engine section, whence it tapers to the conventional knife-edge supporting the vertical rudder. Its overall length is 28 feet. The hull is built of mahogany planking over oak frames, with a number of watertight compartments distributed along its length, and is constructed in two sections to facilitate shipment.

General specifications are as follows: Spread of upper wing, 41 feet 4½ inches; spread of lower wing, 33 feet 4½ inches; depth of wing, 5 feet 6 inches each; gap, 6 feet 8½ inches; area supporting surface, 373 square feet; length over all, 30 feet, 6 inches; length of hull, 28 feet; height, 10 feet 2 inches; power plant, Anzani motor; total weight of power plant, 968 pounds; total weight, net of machine, 2,000 pounds. Propeller, Burgess type, 4 blade; diameter, 8 feet each; pitch 7 feet 9 inches.

The work on the 1913 specification Army aeroplane has been delayed on account of the non-receipt of the 100 H. P. Renault motor which furnishes the power. The parts are all manufactured and the assembly will progress very speedily after receipt of the motor and the armor plate.

The new steel construction and reinforced ribs have awakened a great deal of interest on the part of those acquainted with aeroplane construction. There is no doubt but that this machine represents a stronger type of construction than anything heretofore built in this country.

The three standard Burgess tractors ordered by the Signal Corps are well nigh completed and are also awaiting delivery of motors. The company is employing more men than ever before.

I will never fly again. Fear has driven me out of the skies for all time. Not fear of my own death or the dread of bodily injury for myself has made me give up an art which I dearly love, but the blame and remorse for the death of brother aviators who went crashing into eternity trying to "out-Beachey Beachey." I have quit as pacemaker for Death. * * * I am tormented with a desire to "Loop the Loop" in the air. I know that I can do it, but I know that no one else can do it. * * * They say I have shown wisdom rare in a gambler, for I quit the game when I was a winner.—Lincoln Beachey.

And they say gamblers dont "squeal!" If a winner, why do immeasurable harm by writing rot like this for a few paltry "yellow journal" dollars?

THE LANGLEY AERODYNAMICAL LABORATORY

A concrete plan of organization and conduct of the Langley Aerodynamical Laboratory, inaugurated at a meeting of the Regents of Smithsonian Institution on May 1, has been formulated by the secretary.

An advisory committee, composed of the director of the laboratory, one member designated by the Secretary of War, one by the Secretary of the Navy, one by the Secretary of Agriculture and one by the Secretary of Commerce, and others designated by Secretary Walcott of Smithsonian, a total of not more than fourteen, will advise as to the organization and work of the laboratory.

The organization, under proper regulations and fees, may exercise its functions for the departments of the Government and for any individual, firm or association, provided such department, firm, etc., defray the cost of all material and services employed in the exercise thereof.

The advisory committee comprises a chairman, recorder and twelve additional members, all of whom serve for one year, elected annually about May 6, the new members to be appointed prior to date of election.

The advisory committee is provided by Smithsonian with suitable office headquarters, administrative and accounting systems, library, etc., and the laboratory has an income provided for it of $10,000 the first year and $5,000 annually for five years. The franking privilege of the Postal Service is also provided.

For the exact determination of aerophysical constants, the calibration of instruments, testing of aero engines, propellers, materials, etc., the committee has the co-operation of the U. S. Bureau of Standards, which has complete equipment for studying the mechanics of materials and structural forms; for standardizing instruments; for testing power and efficiency of motors. The Weather Bureau co-operates on every phase of aeronautic meteorology and is completely equipped for this work. The War and Navy Departments have official representatives abroad to report periodically on every important phase of the art; each has an assignment of officers who design, test and operate air craft and who determine largely the scope and character of their development; each has machines in actual service with fields and shops.

Smithsonian Institution possesses the unique character of a private organization with Governmental functions and prerogatives. It can receive appropriations directly from Congress, or be recipient or custodian of private funds, or be the recipient of material objects representing any province of nature or any branch of human knowledge or art.

Endowment or other funds bearing the name of the giver will be accepted. Until adequate appropriations have been made by the Government the activities of the organization and committee will have to be sustained largely by private resources.

SUBSIDISED FLYING

The German national aviation fund committee has decided to expend a large portion of the fund in reliability prizes. Every German flier on a German machine, with a German or foreign engine, who remains an hour in the air—not in a competition—receives $250, and for each further consecutive hour another $250; if with a passenger he receives an additional $125. This holds good from March 1st till December 12th, 1914.

The flier must be insured, must stay at an altitude of 1,500 feet for at least fifteen minutes, the receipt of a prize binding the aviator to place himself at the disposal of the military authorities in case of war, and to participate in a three weeks' practice.

Whoever flies more than six hours at a stretch is entitled to a monthly sum of $500 in addition to the former sum. This income the pilot holds until his record is beaten, but his receipts may not exceed in any case the sum of $2,500.

For the longest distance across country within 24 hours, minimum not be less than 312 miles, the prizes consist of a monthly payment of $750, not exceeding $2,250 altogether—until such time as the winner is beaten in similar manner. A considerable proportion of the fund is to be expended in insurance against accident—a well-known insurance company having agreed to undertake it at a very low premium.

A SOMERSAULT IN THE AIR

A most unusual occurrence reminiscent of Capt. Reynolds' somersault recently befel Capt. Aubry when flying a Deperdussin for the purpose of effecting reconnaissance over the region of Villerupt. "I was returning after a 35 minute flight," he says, "facing a wind of about 22 M. P. H. My altitude was about 2,500 feet. At the moment of descent a series of violent gusts struck the machine, and on throttling-down and switching off, I was obliged to dive in order to make the controls effective.

"As I dipped the nose of the machine," he continues, "a couple of quickly successive gusts struck the top of the main planes and placed me in a *vertical* position. While endeavoring to manipulate the elevator I found the machine had taken me in a perfectly vertical *chute* to less than 1,500 feet. It here adopted a horizontal attitude *upside-down* and proceeded to effect a tail-first *vol-plané*."

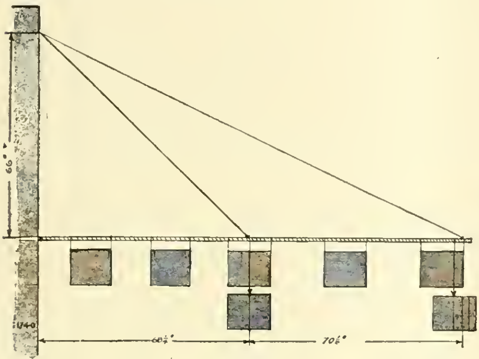
The pilot, fortunately, was able to retain his seat. "The machine then gradually took up the vertical position again, describing a gigantic form of S while doing so. Flattening out, I flew to a spot about two miles distant."

It appears that the captain then desired to make another short flight in order to keep away any "bad impression" that might come to him subsequently, but his mechanic, who had witnessed the whole affair, persuaded him that the top *cabane* might have been weakened by the strain.

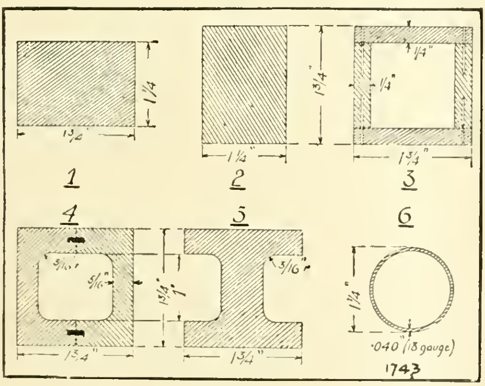
Three prominent French officers certify the truth of this statement.

TESTS OF SPRUCE BEAMS

Alec Ogilvie has recently carried out some tests with various types of white spruce which would be used for the upper rear beam of a biplane. In the test the load was applied as in a Wright machine, assuming the upper plane carries 55 per cent. of the load, or, say, 715 pounds of the 1300 pounds (exclusive of weight of wings), and of this 58 per cent. being carried by the rear beam in normal flight at 42 M. P. H., which, in a machine spreading 40 feet would mean a distributed load of 10.3 pounds per running foot. At a speed of 60 M. P. H. the rear beam is assumed to carry 83.5 per cent. of the load, or 14.8 pounds the running foot.



The method of testing is shown in the accompanying diagram, the wire connections being similar to those in use in Wright machines, and it will be seen the bracing system of this machine is identical with the guying of the beams in the tests. Loading was done by putting bricks in boxes hung from the beam where the ribs would cross the spar and the additional boxes shown represent the calculated strut thrusts.



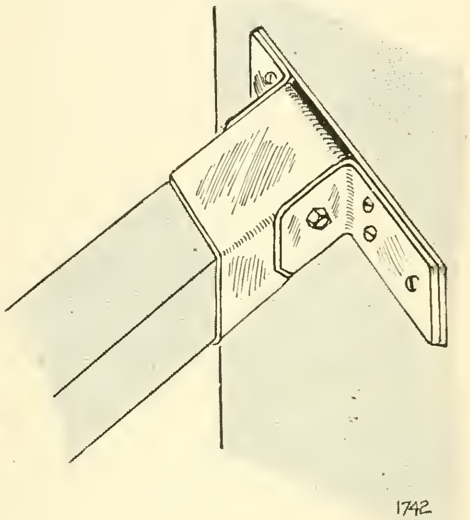
Spar No. 3 was difficult to construct because the glue on such a long length gets cold before the nails can be driven in.

Spar No. 4 is of the Maurice Farman type. Its halves are joined up with a fillet of hard wood. It will be observed that, although expensive to make, it gave very satisfactory results under test.

Spar No. 5 is easily made with a spindle machine, but when tested shows up as being rather weak laterally.

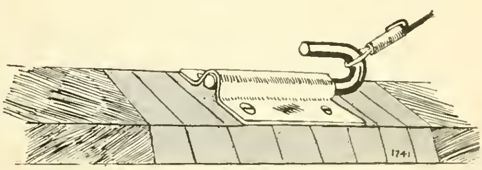
Spar No. 6 is a mild steel tube measuring 1.25 inches in outside diameter. Its section is 19 gauge; it is solid drawn and unannealed.

The breakages were particularly interesting, and the accompanying photographs show up the weakness of the spars very clearly.



Spar No. 1 broke downwards as a beam in the inner bay.* It was obviously at the point of fracture also at the hook joint. There was twice as much deflection in the inner as in the outer bay.

Spar No. 2 broke in the inner bay as a beam. It also broke at the screw holes of the hook fitting. This was probably because the screw holes cut into too large a proportion of the fibres of the spar.



Spar No. 3 showed weakness in the glued joint. It was also weak against torsion, and twisted at the inner hook fixing through an angle of approximately 30 degrees just before fracture. The fine nails used weakened the side members, as is shown by the failure in compression at each nail.

Spar No. 4 is undoubtedly the best spar of the series. It failed as a beam in the inner bay.

---

* "Bay" is the portion of the beam between the supports.

Spar No. 5 is too weak sideways, and the failure occurred in the inner bay by the lateral collapse of the spar as a strut. This was not altogether unexpected, as the low lateral moment of inertia for this spar is very noticeable. It was also apparent from the fracture that a larger radius in the channels would have been an improvement.

Spar No. 6 failed as a beam in the inner bay. The objection to this spar is that it is rather heavy.

TABLE 1.—*Strength*

No.	W. Weight. lbs./ft. run.	E. Coefficient of elasticity mil. lbs./sq. in.	I. Principal moment of inertia. (inches)⁴.	I'. Lateral moment of inertia. (inches)⁴.	EI. mil. lbs. sq. ins.	EI'. mil. lbs. sq. ins.	Cross sectional area. sq. in.	L. Loading carried. lbs./ft. run.	L / W
1	.485	1.94	.285	.558	.554	1.08	2.19	62.3	128
2	.495	2.02	.558	.285	1.13	.575	2.19	104.0	210
3	.354	1.79	.577	.577	1.03	1.03	1.50	60.2	170
4	.405	1.21	.697	.672	.84	.81	1.94	90.3	223
5	.400	1.65	.697	.356	1.15	.59	1.94	83.9	210
6	.517	25.1	.0307	.0307	.77	.77	.157	69.9	135

The units for columns EI[1] and EI are "millions of pound square inches."

TABLE II.—*Deflections*

Maximum deflection in inches in each span at loadings in lbs. per ft. of

No.	Inner Bay. 15.6	26.1	36.6	47.2	Outer Bay 15.6	26.1	36.6	47.2
1	.30	(.70)	1.22	2.18	.37	.66	.85	.94
2	.10	.21	.34	.50	.16	.29	.41	.52
3	.16	.38	.61		.35	(.53)	.70	
4	.18	.32	.50	.72	.30	.48	(.65)	.80
5	.13	.24	.35	.49	(.18)	.30	.44	.57
6	.10	.24	.51	.90	(.30)	.50	.67	.85

The bracketed deflections were interpolated.

GERMAN DIRIGIBLES

The best known German dirigibles are the Zeppelin, Schütte-Lanz, Parseval, Siemens-Schuckert and Gross. These five types differ markedly from each other in construction. The two first have rigid balloon bodies. Zeppelin uses aluminum and Schütte-Lanz, wood for the material of the frame. Both types of construction have so far proved good. The Zeppelin has often remained very long aloft in test flights; thus, a short time ago it accomplished a 36-hour voyage without any accident or stop whatsoever. These ships are built so that they can land on water and they are, therefore, purchased by the naval administration. The motors are very reliable and are manufactured by a sister company of the Zeppelin shipbuilding concern (Maybach motors). Herr Maybach was formerly an engineer with the Daimler (Mercedes) Motor Co. The Daimler Motor Co., besides Maybach, makes airship motors. They are of 100 H. P. and 200 H. P. The products are of about equal value, but it may be that Maybach has had the greater experience with airship motors. The other German airship motors cannot be counted as first class.

The rigid ships manoeuver very well in the air, but good hangars are necessary. Turnable hangars are the best. There is one in Germany. The long trips made by the rigid type are made possible principally by the minimum gas loss which characterizes this system. In the rigid ships the gas is not contained at large in the balloon body but in balloonettes, which are confined within the main balloon body. The balloonettes are very impervious to gas. Recently they have been made out of gold beater's skin. The balloonettes are furthermore surrounded by the air inside the balloon body and by the balloon covering itself, which hinder the invasion of the sun's rays. It is a great advantage of the rigid type that the outer shape of the body cannot be altered by temperature changes. The chief difference between the Schütte-Lanz and the Zeppelin airship lies in the material of which they are built and in the outer shape. Neither factory takes orders for export.

The Parseval dirigibles are the most widely used in Germany. They have the great advantage over the rigid types, that they can be emptied anywhere and packed for transportation. The Parseval patents have been purchased by the Luftfahrzueg-Gesellschaft m. b. h. in Bitterfeld, and orders for export are taken by the company.

The Siemens-Schuckert airship is of very large dimensions and possesses a high load-carrying power. It differs from the Parseval ship only in the details of construction. A half-rigid dirigible exclusively for military use is manufactured by Maj. Gross, but it has been supplanted by the types mentioned above.

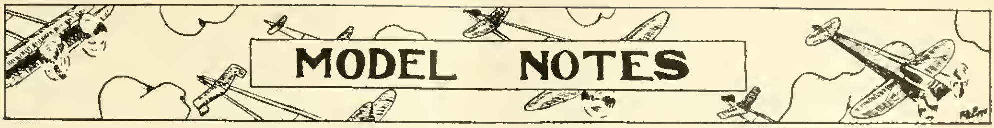
The speed of a Zeppelin airship, equipped with a 500 H. P. engine reaches some 70 kilometers (43.5 miles) an hour. A Zeppelin can carry more than 30 persons.

A subscriber wants to know why aero clubs do not investigate fatal accidents and endeavor to determine the causes for the general benefit of the art. "Search us!" AERONAUTICS has urged this but nothing has ever come about.

I wish to say a word in regard to your magazine while I am writing. Ever since the early part of 1910 I have been reading your magazine and I don't know what I would have done in several cases without it. It has proved a boon to me ever since the start. I also wish to congratulate you upon the technical work that you publish. Out here much work is done by such articles and great improvement has been issued therefrom.—*L. S. W., Calif.*

AEROPLANE GUNS IN U. S. ARMY

According to the Ordnance Department of the U. S. Army, the development of special batteries of guns for firing at aeroplanes is considered impracticable. In the development of field artillery, however, the carriages are now being built to provide for high elevations which will permit of their being used against aeroplanes if necessary. The new field gun carriages will also permit of a greater traverse of the gun on the carriage than formerly, which will permit of following a fast moving target for a considerable distance without moving the carriage itself. These changes, however, are not directly caused by the use of aeroplanes but are the natural improvements in field gun carriage design.



Obst Tractor No. 36

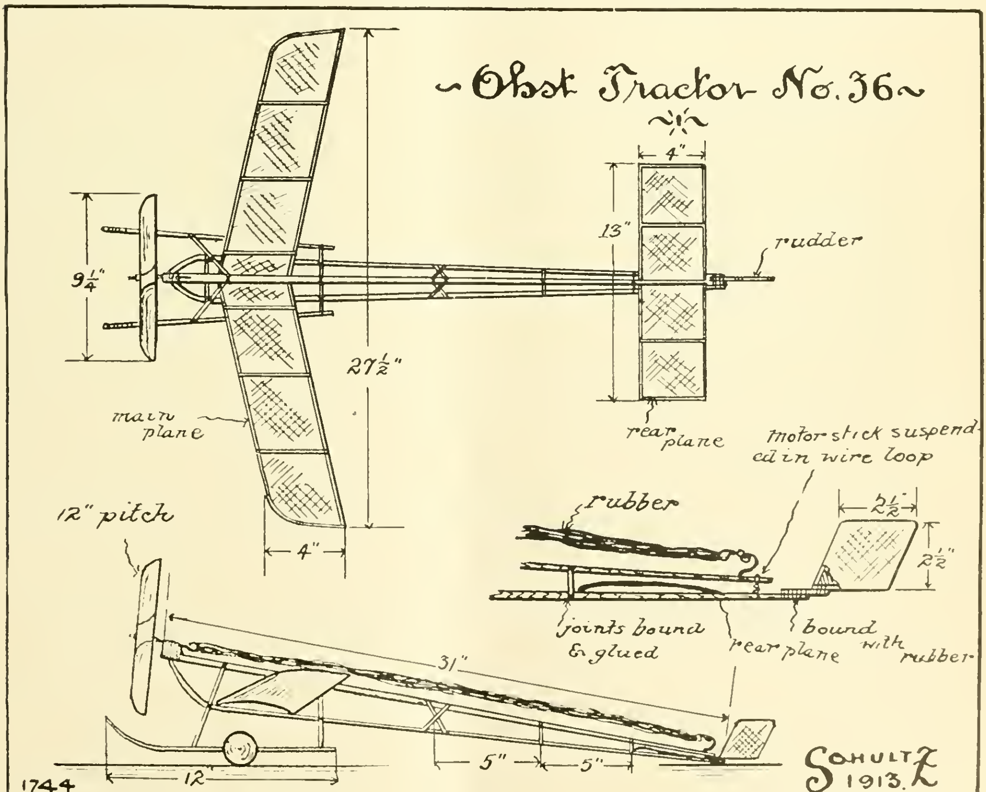
By HARRY SCHULTZ, Model Editor

The model shown in the accompanying drawing was designed by Mr. C. V. Obst of the Long Island Model Aero Club.

It is a scientifically designed tractor model and has shown its great stability by flying in heavy winds, as the writer can personally testify to. Hand launched it has repeatedly made flights of over 600 feet and when used as a R.O.G. model has made a duration of over 40 seconds.

The centre of gravity and centre of pressure coincide while the thrust is 1¼ inches above the centre of pressure. The weight of the model complete and ready for flight is 4 ounces.

The fuselage is built up in a triangular form and is 31 inches in length, 2 inches wide and 2½ inches high at the front, tapering to a point at the rear, the two lower spars being bent up at the front to join the upper spar, as shown. The fuselage is held rigid by a series of bamboo braces, each 5 inches apart. Upper spar is poplar ¼ inch square, tapering to ⅛ inch square at the rear where it is rounded and held loosely in a loop of wire. By this method the whole torque of the motor is taken up by the last 6 inches of this spar and the whole frame is not twisted. The lower spars are maple dowel sticks 3/16 inch diameter, planed on two sides and tapering towards the rear. All joints are bound and glued with Ambroid, then the entire frame is shellaced. The main plane is 27½ inches in spread, with a chord of 4 inches. The centre point of the same is 2 inches in advance of the tips and the plane has a dihedral angle of 145 degrees. The plane is made entirely of bamboo and the front spar of the same is bent around to form the ends. Seven ribs are used, placed 4¼ inches apart and having a camber of ⅜ inch. The plane is covered on the under-



side with silk fibre paper treated with Ambroid varnish. The rear plane is rectangular in form, 13 inches by 4 inches, and is made of bamboo, and covered and treated in the same manner as the main plane.

The rudder is made of a single piece of split bamboo bent to the shape shown, with a flat piece projecting forward for binding the same to the frame with rubber. It measures 2½ inches by 2½ inches and is double surfaced with silk fibre paper and treated with Ambroid.

The screw is 9¼ inches in diameter and 12 inches pitch and a blade width of 1½ inches. It is driven by 14 strands of ⅛ inch flat rubber 27 inches long placed above the frame and gives a thrust of 2 ounces, at 1,000 R. P. M. The propeller bearing is of tubing and the shaft is a heavy threaded rod with washers and nuts.

The landing gear consists of two 12 inch bamboo skids bent up in front to protect the propeller. The skids measure ¼ inch by 1/16 inch in cross section and taper to ⅛ inch by 1/16 inch at the rear. The skids are attached to the fuselage by four uprights as shown. A pair of 1¼ inch tin wheels covered with fibre and revolving on a steel axle are slung from the skids by rubber bands.

The model is a fast and steady flyer and has won many contests when the wind was of such velocity as to prevent other tractor models from remaining in the air.

THE BAUER PARACHUTE DROPPER FOR MODEL AEROPLANES

The device shown in the accompanying drawing is the idea of George Bauer, of New York, and is a very ingenious device for the dropping of small parachutes from model aeroplanes while model is in free flight. The device has been tried out many times at Van Cortlandt Park and works excellently.

The device is applicable to model aeroplanes with the usual "A" frame, but with minor modifications it may be readily applied to any type model. It is usually placed a few inches in front of the centre of gravity but it may be placed wherever desired, according to the machine in which it is placed.

In the drawing, ff represent the two main bars of the frame. The receptacle for the parachute is constructed of a sheet of aluminum, 34 gauge, bent to a stream-line form as shown; about a half inch of the same on each side is bent and secured together, as shown, to form the rear of the receptacle. At the rear of the receptacle 2, a small brass lug 3 is attached, this lug having a perforation 4 therein. Through this perforation 4 extends a small bolt or paper fastener, this bolt or paper fastener holding on the bottom 5 of the receptacle very loosely so that it can swing very easily from side to side. On one side of the bottom 5 an upright lug 6 is formed as shown. Another lug 7 is formed on the front of the bottom plate as shown, this lug being provided with a small perforation. The receptacle is secured to the frame of the model by being attached to the two bamboo braces 1,1 as shown.

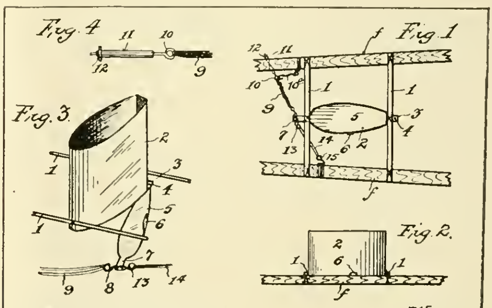
Attached to the frame in the position shown is a small wire hook 15, and running from this hook to a hook 13 is a small rubber band 14, this rubber band being stretched when placed upon the hooks, the object being to hold the door of the parachute receptacle open (see Fig. 3).

On the opposite framework, a small piece of tubing 11 is secured. In this tube a wire shaft turns freely; upon the outer end of this shaft a tiny copper washer is soldered, and on the other end of the shaft a hook 10 is formed. Attached to the frame is another hook 10a as shown. Running from the hook 10 to the hook 8 is a small rubber band, this band being hung very loosely between the hooks.

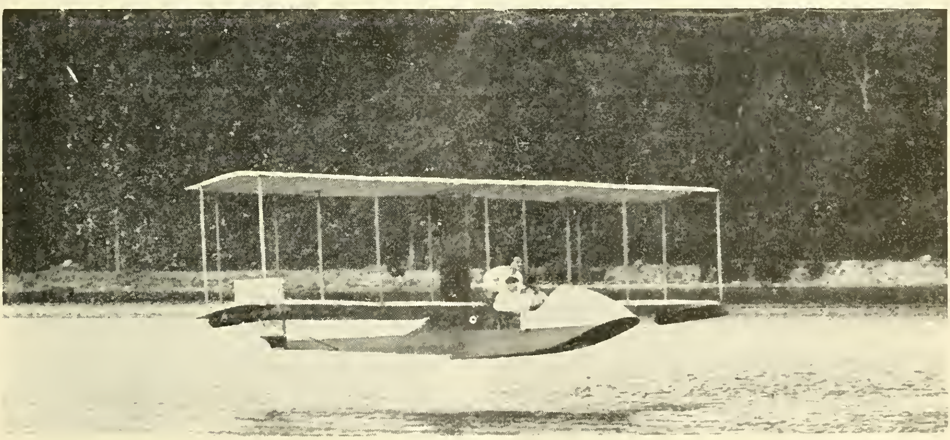
The operation of the device is as follows:

The hook 8 is attached to the ordinary winder for winding up the motors of the model aeroplane, and the hook 10a is inserted in the hook 10, to prevent the shaft from turning in the tube 11 while the rubber is being wound, and then the rubber is wound up (the number of winds being governed by the time when it is desired that the parachute drop). When the rubber is wound it is hooked back in its proper position, and it then will draw the door 5 of the parachute receptacle closed, the lug 6 preventing the door from being pulled over too far. The parachute is then placed in the receptacle.

The model is then wound up and the hook 10a is released from its interlocking position with the hook 10, thereby allowing the hook 10 and its shaft to revolve in the tube 11 under the power of the rubber band 9. The model is then launched for flight. When the winds in the rubber 9 have wound out (this taking about 20 seconds, although the time may be regulated as desired as hereinbefore stated) the rubber will hang loosely, allowing the rubber band 14 to draw the door 5 open (Fig. 3), and the parachute will fall out, open in two or three feet and gently descend to earth, this having no effect on the flying of the model. If the device is made properly it should not weigh more than 1½ ounces.



~PARACHUTE DROPPER FOR MODEL AEROPLANES.~



AERONAUTICS

Published Monthly by Aeronautics Press
122 E. 25th ST., NEW YORK
CABLE: AERONAUTIC, NEW YORK
'PHONE, 9122 MADISON SQ.
ERNEST L. JONES, Pres't — — THOMAS C. WATKINS, Treas'r-Sec'y
ERNEST L. JONES, Editor — — M. B. SELLERS, Technical Editor
HARRY SCHULTZ, Model Editor
SUBSCRIPTION RATES
UNITED STATES, $3.00 FOREIGN, $3 50

No. 72 AUGUST, 1913 Vol. XIII, No. 2

Entered as second-class matter September 22, 1908, at the Postoffice, New York, under the Act of March 3, 1879.

¶ AERONAUTICS is issued on the 30th of each Month. All copy must be received by the 20th. Advertising pages close on the 25th.

¶ Make all checks or money orders free of exchange and payable to AERONAUTICS. Do not send currency. No foreign stamps accepted.

Aero Mart

MODEL CONTESTS

Brooklyn, N. Y., July 13, 1913—A tractor contest was held by the Bay Ridge Model Aero Club on the above date. Flights from the hand of over 600 feet were made by W. F. Bamberger, with a duration of 43 seconds. A flight of 25 seconds was made by L. Bamberger. The models were all single propellered. The members of this club are greatly interested in Tractor models and are desirous of competing with other clubs in contests of this kind.

A contest for biplane models, rising from the ground, for duration will be held by the Long Island Model Aero Club on Sept. 1, 1913, at their grounds, Old Mill Park, Crescent Ave., Brooklyn, N. Y., for a silver medal.

At a competition for duration from the hand, held at the Ingleside Golf Grounds in California on May 30th, the world's record was broken by W. L. Butler of Vista Grande, Cal., who made a flight of 170 seconds. It is interesting to note that Mr. Butler, who is one of California's best model flyers, made five other flights, all over 100 seconds. The official world's records now stand as follows:

Duration from hand, W. L. Butler, 170 secs.
Distance from hand, Arthur Nealy, 2,740 ft.
Distance from ground, L. Bamberger, 1,542 ft.
Duration from ground, W. F. Bamberger, 81 secs.
Hydroaeroplane duration, Geo. A. Cavannah, 60.4 secs.
Tractor hydro. duration, Harry Herzog, 28.4 secs.

At the semi-annual election of the Long Island Model Aero Club held in July, the following members were elected officers: Charles V. Obst, President; Dan Criscioli, Secretary, George H. Gorgas, Treasurer and Harry Schultz, Corresponding Editor and Club Photographer. The club is growing fast. Meetings are held every Friday evening at 8 p. m. at 123 Euclid Ave., Cypress Hills, L. I. Every Sunday morning at 9 a. m., much interesting flying and testing of new models can be seen at the club grounds at Old Mill Park, Brooklyn. Monthly contests are held with silver and bronze medals as prizes. Nonmembers are permitted to compete in these contests on payment of a small fee.

During the past two months a great deal of fine flying has been done, and many new and interesting machines have been brought out. Freeland and Ness have been making duration flights with featherweight machines, while Hackradt with a heavy, original type speed monoplane has shown his model capable of fine altitude and distance. Obst has been making excellent high flights with his novel tractor model. He has lately brought out a small staggered biplane model which has made excellent flights. Fine R.O.G. flights under favorable weather conditions have been made by King. Ness has been experimenting with a flying boat model, which has given promising results. H. Criscioli has under construction a six foot monoplane model of which excellent results can be expected. Scientific models are becoming very popular among the members of the club, and models of this kind have been constructed by Corgas, Obst, Cavanagh and Funk. Some of the members are experimenting with other methods of propulsion besides rubber. A power turbine is being tested by one flyer and a machine is all ready for its installation. Two other members have designed a simple steam driven model with many original ideas. The same is now in the course of construction and will soon be completed.

Address all inquiries regarding model flying to the model editor, Harry Schultz, 252 West 115th St., New York City, N. Y.

News In General

NEW ARMY AEROPLANES

About September 15th the official tests will be made of the new high-powered military machines in which the engines are now being installed. These machines are: a 100 H. P. Renault motored aeroplane from Burgess Co. & Curtis, a 90 H. P. Austro-Daimler motored Wright and a 160 Gnome engined machine from Curtiss.

In addition to these machines there are due to be delivered this autumn three Burgess tractors with 70 Renaults and one Curtiss tractor. These machines will all probably be delivered by the first of November, making a ttotal number of machines in the possession of the Signal Corps at that time, twenty-four.

A field has been leased for three months at Osborne, O., near Dayton, for the purpose of conducting tests on the three new aeroplanes ordered to conform to the most recent requirements for military type aeroplanes formulated by the office of the Chief Signal Officer. A synopsis of these rigid requirements were printed in AERONAUTICS for February.

IN THE NAVY

The Navy will purchase as many machines as it can use to advantage, or, in emergency, as many as may be required, but it is the intention of Captain Chambers to keep along with development and expects better results with each machine. Just now, no new ones will be ordered until the matter of a standard control is settled and this is being done as rapidly as possible.

THE GYRO MOTOR IN ENGLAND

The Gyro motor is coming in for a good deal of attention through the sensational flying of the aviator demonstrating it and the machine is being advertised as one of the attractions at the Hendon weekly meetings which are always novel and crowd-drawing and have proven wonderfully producting of live interest. The few attempts made in America by clubs to hold anything like regular "days" invariably prove fizzles from the attendance point of view. The recent review on Long Island by Navy officials resulted in magnificient flying by the Moisant and other flyers but outside of the Navy men themselves the public was not among those present.

Claude Grahame-hyphen-White might be able to duplicate Hendon over here, but no one else seems to have the knack.

ALTITUDE RECORD ALMOST BROKEN

The American altitude record, 11,642 feet, as made by Lincoln Beachey at Chicago in 1911, was almost broken at Bath, N. Y., July 26, when Frank Burnside reached a height of 11,450 feet. Burnside is connected with the Thomas Brothers aviation school and in the flight operated one of their new type headless biplanes. He ascended at 4:29 o'clock and completed the flight at 6:15 o'clock, being in the air one hour and 46 minutes.

The day was very clear, the sky almost cloudless, and yet he would disappear from sight at times, while directly overhead. It was a beautiful flight. The machine and motor behaved perfectly. A new Curtiss O-X motor was used.

Burnside said that the earth seemed to be saucer shaped, and that a great concrete wall surrounded this concaved earth; and, of course, he was always directly above the centre; and that around the top of this dark concrete-like wall, the horizon appeared woolly.

On July 31, Burnside left the school grounds at five o'clock and landed on the Curtiss field at Hammondsport at 5:10. He visited with a number of his friends, attended a dance, and returned the following morning.

For the Perry's Victory Centennial Celebration, August 16, Walter Johnson will have the flying boat, equipped with a 90 H. P. Austro-Daimler, and Frank Burnside will pilot the hydroaeroplane. This will be equipped with a 90-100 Curtiss.

SPEED ALONE WILL NOT WIN INTERNATIONAL 'PLANE RACE

The distance this year for the international aeroplane race will remain at 200 kiloms. over a minimum circuit of 5 kiloms. Competitors must pass a preliminary test consisting of a flight over a straight course of two kiloms., there and back, speed to be taken both ways, which must be no more than 70 kiloms. an hour, mean. The winner, therefore, of the contest will be he of the machine which has the greatest range of speed.

NEW CORPORATIONS

Heinrich Aeroplane Co., Inc., Baldwin, N. Y.: manufacturers of aeroplanes; capital, $15,000. Incorporators: Arthur O. Heinrich, Albert S. Heinrich, Baldwin, L. I., N. Y.; Henry C. Karpen, 584 Broadway, Brooklyn.

Shaw Aeroplane Co., Portland. To build aeroplanes, give exhibitions, etc.; capital, $500,000. President, R. C. Brown, Somerville, Mass.; treasurer, C. J. Poingdester, Belmont, Mass.

G. S. A. Aviation Company, Inc., Hornell, N. Y. To manufacture and exploit aerial machines, etc. Capital, $10,000. Incorporators: Clinton Gray, 222 Main street; George A. Salzman, 28 W. Genesee street, and Harry L. Allen, 27 Armory place, all of Hornell, N. Y.

The Flying Association, Inc., New York City. To manufacture and exploit aerial craft and to conduct a general publishing business in connection therewith. Capital, $30,000. Incorporators: Thomas A. Stoddart and Arthur C. Beck, both of 2 Rector street, New York City and David Kaess, 11 Broadway, New York City.

The Atwater Safety Flying Machine Company, Akron, Ohio. Capital, $25,000. Incorporators: M. L. Atwater and Joy Atwater, both of Akron, Ohio.

Aero Sales Company, Inc., Springfield, Mass. Capital, $50,000. Directors and officers: George Ulrich, president and treasurer, Hartford, Conn.; C. H. Sughrue and J. J. Tanzy, both of Springfield, Mass.

Itala Aeroplane Company, Inc., New York, N. Y. Capital, $100,000. Incorporators: Rubino Plastino, 49 Maiden Lane, New York, N. Y.; Arthur B. La Far and George R. Cooper, both of 80 Maiden Lane, New York, N. Y.

IMPORTS AND EXPORTS

Three aeroplanes and parts of domestic make were exported during June with a value of $7,826. No imports for the month. During 12 months, ending June 30, 13 machines and parts were imported, valued at $52,696. There remain in the warehouse 3 foreign machines of a value of $11,623.

August Stenzy, a Baltimorean, who catalogues several aeronautical motors of great powers, was restrained by three policemen from leaping over the lieutenant's desk to attack his wife when he received a sentence of 60 days in jail for beating his mate, who swore out a warrant for him, according to the Baltimore *Sun*. Must have thought he was aviator Beatty!

DEATH OF ROCHE

Henri de la Roche, who claimed to be a French aviator, died in the hospital at Omaha, Neb., on August 15th, from injuries received the previous week in getting off the ground with an experimental machine. He pulled back on the elevator suddenly, the 'plane lifted and fell on one wing. Eye witnesses state that apparently the man was not accustomed to aeroplanes. He claimed to be a brother of Baroness de la Roche.

DEATH OF BRYANT

Johnny Bryant was killed at Victoria, B. C., on August 6, when he landed on the top of a two-story building. Bryant was an exhibition flyer of three years' experience. It is reported that the accident was due to improper repairs. As usual, no official investigation is made of these fatalities.

DEATH OF COLONEL CODY

Col. S. F. Cody was killed while trying out a new aeroplane of his own construction on August 7th at Aldershot, England. His passenger, named Evans, was also killed.

The machine used at the time of the accident was a new hydroaeroplane, fitted with a 100 H. P. motor and was built for the race around England and Scotland, for which a prize of $25,000 is offered. The machine appeared to "crumple up," the wings suddenly shooting upwards and the whole structure collapsing.

Col. Cody's death is the hardest blow that British aviation has felt, perhaps, since the time of the tragic loss of Rolls. He was an Anglo-American, born in Fort Worth about 1861. A few years ago he became a British subject.

He was a cow puncher in his early days and later turned his attention to experimenting with man-lifting kites. Going to England he continued his experiments and achieved such success that the British War Department attached him to its aviation staff and he helped to design and construct the first British dirigible. In 1908 he made short flights with his first aeroplane. In 1909, Cody broke the world's record for cross-country flight, flying 40 miles over the country around Farnhorough. He won all of the British Michelin prizes but one. Last year he won the $20,000 prize in the military competition open to the world, and $5,000 for British machines. He was also awarded $25,000 for his kites.

Col. Cody was buried at Aldershot on August 11th, with military honors.

Mr. Evans, the other victim, was a sportsman and an officer in the Indian Civil Service.

"The most reasonable assumptions are either that a wire of some fitting came loose and hit the propeller which broke, the fractured blade flying forward and cutting the rear spar, and so letting the whole wing fold up, or else that the spar broke and the flying pieces broke the propeller.

It is believed that both Cody and his passenger, Mr. Evans, might have been saved if they had worn safety belts, for the evidence is conclusive that they were thrown out as the machine broke, and came to the ground some distance from the machine which itself came down on the tops of some trees which so broke the fall that the central section, comprising the seats for the pilot and passenger, and the engine, came down comparatively gently, the engine not being torn from its bed, and the woodwork surrounding the seats not being broken anywhere."

EVERYTHING FOR THE MODEL MAKER

Everything imaginable in the way of supplies and scale models, and then some more is listed in the new 48-page catalogue of the Ideal Aeroplane & Supply Co., the fourth issued, beginning with a little sheet of 6 pages a couple of years ago. Even Cecil Peoli is made famous by a model named after him because it is a replica of his record model made when he was a model flyer instead of a real dyed-in-the-wool aviator. Models to scale may be had of the well-known types of aeroplanes, even to the latest Curtiss flying boat. This is a surprise catalogue.

SCOTT TO DROP BOMBS FOR ARMY

Riley E. Scott is to drop bombs at the army's field at San Diego in the near future at the request of General Scriven, chief signal officer. The army wants to know if Scott can drop bombs with as great continued accuracy as he did when he won the Michelin prize for bomb dropping over all foreign competitors on their own ground, and if these bombs will do as great damage as promised by the bomb dropping adherents. The French Government has bought several of Scott's devices, of which a full description has appeared in AERONAUTICS. Scott is now on the Pacific Coast.

BALLOON ASCENSIONS

Akron, O., July 19.—R. A. D. Preston, pilot, with N. M. Patterson in the "Goodyear" to Hadley, Pa. Distance, 70 miles; duration, 6 hours 30 minutes.

AKRON DISTANCE RECORD

Akron, O., July 26.—R. H. Upson, pilot, and Dr. J. S. Millard in the "Goodyear" to Rushford, N. Y., covering 190 miles in 11 hours 15 minutes.

This last flight was a very good illustration of the possibilities of steering spherical balloons. "We went due north for a while, but gradually brought around to the northeast striking Lake Erie at Ashtabula. We found the wind below 1,200 feet to be blowing toward the lake, but above that to be from the lake, and by keeping the balloon at the proper height we succeeded in just skirting the shore for a distance of over 60 miles, passing over the cities of Ashtabula, Conneaut and Erie."

Other ascensions from Akron, unlisted, are: One on July 4th, 30 miles in 2¾ hours; one on June 17th, 100 miles in 5 hours.

Kansas City, July 27.—H. E. Honeywell and party were up in the "K. C. III," using lunch for ballast. The aeronauts want to know what becomes of the weight when the lunch is eaten.

"If you eat a pound of food you don't weigh a pound more than before eating it. You weigh a few ounces more, but not a pound. What becomes of the weight, I'm not philosopher enough to say, I only know it is a fact. So by consuming some ten pounds of food yesterday, we lightened the balloon by several pounds, and arose accordingly."

The party finally made a safe landing on the Kellerstrass farm, south of Kansas City. The start was made from Overland Park.

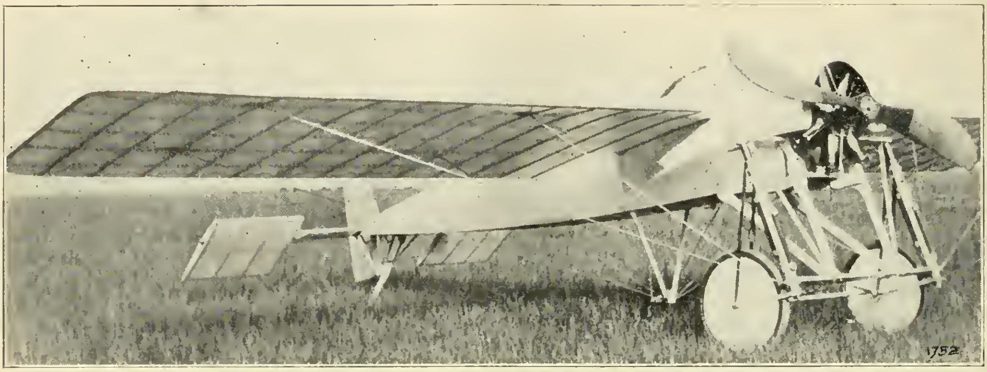
Phila., Aug. 23—A. T. Atherholt, pilot, Harrison Smith and G. B. Newbold in the "Penn." to Lakewood, N. J.

RECRUITS WANTED FOR AVIATION SERVICE

It is desired to invite the attention of officers of the army to the status of aviation in our service. At present the law permits the detail of 30 army officers for aviation and provides an increase of thirty-five per cent. pay and allowances while on such duty. It is hoped Congress will enact legislation providing for further increase of pay and other advantages.

About ten vacancies are now existing. Applications for these will be given due consideration, taking into account the order of their receipt. The detached service law does not apply to officers on aviation duty. Experience in training officers for this duty has shown that it is advisable to limit the details to men not exceeding thirty years of age. The applicant should be certain of his fitness physically and temperamentally. This involves excellent eyesight, good hearing, endurance, quickness of action and presence of mind. Blanks covering these points may be obtained from the Chief Signal Officer, Washington, D. C., on application.

North Carolina man wants $25,000 for involuntary ride through air in the suit of J. W. Smith against the Cumberland County (N. C.) Agricultural Society for $25,000, which Smith demands for "mental anguish," he is alleged to have suffered during an involuntary ride he took when his foot was caught in a rope attached to a balloon on the grounds of the society last fall and was carried a mile through the air. And yet, some people buy 5,000 dollar aeroplanes to do the same thing.



New Moisant Monoplane. Designed by Kantner

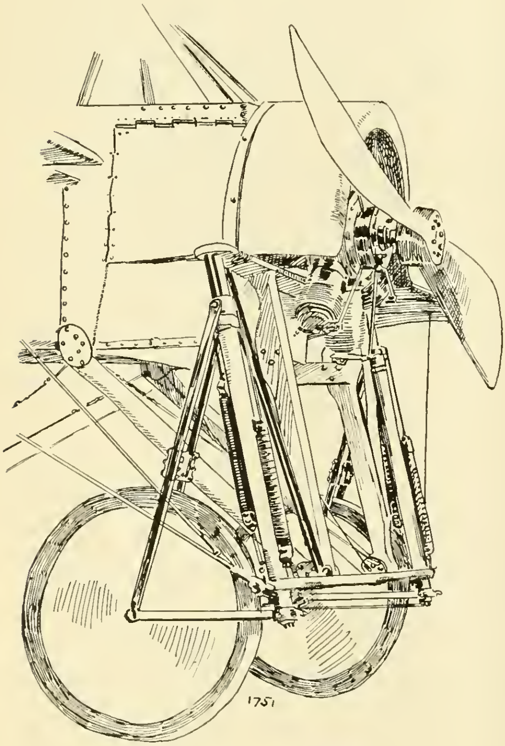
WOOD BREAKS CROSS COUNTRY RECORD

August 8—The American cross-country non-stop distance record was probably broken when C. Murvin Wood, the Moisant flyer, flew from his shed on the Hempstead Plains, L. I., to Gaithersburg, Md., where he landed to adjust his engine, which had been missing for some time, and to get his bearings, after having become lost in the smoke and haze over the city of Baltimore. The distance has been figured as 239 miles. His total time in the air was 5 hours, 1 minute.

Wood started at 4:30 in the morning in the attempt to fly to Fort Myer, Washington, demonstrate his new monoplane before army and navy officials, and return the same day. The incident at Gaithersburg delayed him until late in the afternoon, when he finally completed his journey by landing on the parade ground at Ft. Myer, where General Leonard Wood and several officers were waiting. At 4:30 a special train engaged by the Moisant company, the builder of the machine, left the Pennsylvania station and though it made over 90 miles an hour for portions of the distance, a delay at Philadelphia to get word of Wood's location allowed him to get some twenty minutes ahead of the train at that point, so that further attempts to beat Wood to Washington were given up by those on board the train.

Later demonstrations were made before officials of the army and the machine finally shipped back to New York.

The longest non-stop cross-country record, made in this country is the official 220 miles of Lt. Milling and passenger, made between Texas City and San Antonio.



Chassis of the New Moisant

PRINCIPAL EVENTS

July 22—Glenn Martin left Muskegon, Mich., at which point he had abandoned the Lakes Cruise, at 6:45 a. m. and landed at Grant Park, Chicago, at 12:50 p. m., covering a total of 160 miles. The trip from Muskegon to St. Joseph was made without a stop, a distance of 80 miles. The next stop was Calumet Park where more fuel was taken on to finish the trip. He carried with him Charles Day, the builder of the machine.

August 6—Beckwith Havens, with a passenger, left the Detroit Motor Boat Club at 5:25 p. m. for Toledo, where he arrived safely, covering a distance of 55 miles in 65 minutes. With Harry Atwood he flew to Detroit again and back to Toledo, going one way in 37 minutes.

August 15.—Grover C. Bergdoll flew alone from Llanerch, Pa., to Atlantic City, N. J., a distance of approximately 63 miles in 1 hour 50 minutes in his Wright, his second flight to Atlantic City within a year.

Aug. 23—Havens arrived at Cleveland on way to Buffalo, having made stops at Sandusky and Cedar Point on the way.

FAIL TO INDICT DE VILLERS

The Curtiss aeroplane company tried on Aug. 26 to have Yves de Villers, president of the notorious Aeroplane Motor and Equipment Company, indicted on a charge of grand larceny.

Curtiss made a contract with the Government to furnish a Gnome 160 H. P. tractor.

"Curtiss said that he contracted with De Villers to furnish the motor for $7,772, and that after various delays a second-hand motor, not equal to 160 H. P. was delivered. The payment of $5,239.67 in June was the transaction on which the charge was based. The grand jury decided that no crime had been committed."

BALDWIN

Vulcanized Proof Material

For Aeroplanes, Airships, Balloons. First Rubberized Fabric on the market. Lightest and strongest material known. Dampness, Heat and Cold have no effect. Any strength or color.

"Red Devil" Aeroplanes

That anyone can fly. Free Demonstrations.

Hall-Scott Motors

Eastern distributor. 40 h. p., 4-cyl.; 60 and 80 h. p., 8-cyl., on exhibition at Wittemann's. All motors guaranteed. Immediate delivery.

Experting

Will install a Hall-Scott free of charge in anyone's aeroplane and demonstrate by expert flyer. Expert advice. 'Planes balanced.

Private Flying Field

Fine private field with smooth water frontage for hydro-aeroplanes. Private sheds and workshop. Located at Oakwood Heights, Staten Island.

CAPTAIN THOMAS S. BALDWIN
Box 78, Madison Sq. P.O. New York

AEROPLANES

U. S. Patents Gone to Issue

Copies of any of These Patents may be Secured by Sending Five Cents in Coin to the Commissioner of Patents, Washington, D. C.

Even in these enlightened days, the crop of patents on absolutely worthless, or even questionable, devices increases rather than decreases.

It would take an entire issue of the magazine to abstract in a full and clear manner the claims of the majority of the patents issued. In a great many cases it is even impossible to give in a few lines what sort of an apparatus the patent relates to. In most instances we have used merely the word "aeroplane" or "helicopter" if such it is. Where it is impossible to indicate the class, even, in which the patent belongs, without printing the whole patent, we have used the word "flying machine."

The patents starred (*) are those which may be found of particular interest; but it must be understood we do not pretend to pass judgment upon merits or demerits.

Where patent seems to have particular interest, the date of filing will be given.—*Editor.*

Do not attempt to invent in a field the science and prior art of which are unknown to you—William Macomber.

ISSUED JULY 15

1,067,773—Joseph A. Steinmetz, Philadelphia, Pa., APPARATUS FOR DEFENDING AGAINST AIRCRAFT, consisting of captive aerial bombs which explode on contact. Filed Sept. 6, 1912.

ISSUED JULY 22

1,068,108—Giuseppe Colucci, Boston, Mass., AEROPLANE in which there are alternately biplane and monoplane surfaces arranged tandem.

*1,068,110—Newton B. Converse, Fresno, Cal., STABILITY system using compressed air or electromagnet devices.

1,068,165—Peter Peterson, San Francisco, Cal., Spring device for giving an initial upward impetus to an aeroplane at the moment of starting.

*1,068,166—Peter Peterson, San Francisco, Cal., LANDING GEAR in which pontoons and wheels are employed and pontoons raised for purpose of landing on land.

1,068,311—Romulo Felix Burga, Liverpool, England, AEROPLANE; wing surface, means for adjusting inclination or curvature of main planes, etc.

1,068,332—Rudolph G. Dressler, New York, N. Y., FLYING MACHINE with oscillating wings.

ISSUED JULY 29

*1,068,437—Augustus F. W. Macmanus, San Antonio, Texas, STABILITY device employing ailerons between main planes and vertical rudders moved by a swinging weight, such as motor and pilot.

1,068,501—John S. Jorgensen, Reno, Nevada, AEROPLANE.

1,068,651—De Bert Hartley, Chicago, Ill., AEROPLANE with tilting supporting and controlling planes, automatically or manually operated; balancing sustaining planes pivoted on longitudinal axes with areas outside pivots overbalancing that inside, etc.; 31 claims.

1,068,652—De Bert Hartley, Chicago, Ill., AEROPLANE with main planes dihedrally angled or curved pivoted to change angle of incidence, capable o being independently or simultaneously warped, etc. 29 claims.

1,068,663—James C. Johnston, Blackwell, Okla. STABILITY device comprising front, rear and sid controlling planes swing about axes transverse t line of flight, levers, etc., operated by pendulum.

1,068,727—Guido Antoni and Ugo Antoni, Pisa Italy, SURFACE; a lifting plane which is rigi along front edge with a part of its rear edge adjacen to the body of the aeroplane flexible upward an downward and warped into an upward curve.

ISSUED AUGUST 5

1,069,138—Henry L. E. Johnson, Washingtor D. C., STRUCTURE patent providing for an inverte arch structure under the lower plane, on whic motor and operator may be carried if desired.

1,069,332—Richard F. Hommel, San Francisco, Cal PIVOTED PROPELLER driving motors on eac plane, adjustable "centerboard."

*1,069,346—Stanislaus Palmowski and Wincer Chwalkowski, New York, N. Y., means for CHANG ING THE ANGLE OF INCIDENCE of main wing by rotating them about an axis.

ISSUED AUGUST 12

1,069,662—Daniel W. Adams, Glendale Spring N. C., PARACHUTE LAUNCHING device fc aviators.

1,069,688—Joseph Gavura, Johnstown, Pa., COM BINED AEROPLANE AND AUTOMOBILE.

1,069,694—Louis Adolphe Hayot, Beauvais, France JET PROPULSION device for sustaining and pro pelling aeroplanes.

1,069,823—Alfred M. Sipes, Mobeetie, Texa DIRIGIBLE propelling device.

1,069,906—Henry J. Snook, Santa Monica, Cal HELICOPTER.

1,070,197—Charles Scott Snell, London, Englanc means for supplying stores or other articles to aeri craft while in flight by a winding mechanism, hoistin device, grapple, etc.

1,070,200—Peter Stolberg, San Francisco, Cal BALANCING DEVICE comprising vertical surface pivotally mounted at extremities of the lower plane means for shifting, etc.

ISSUED AUGUST 19

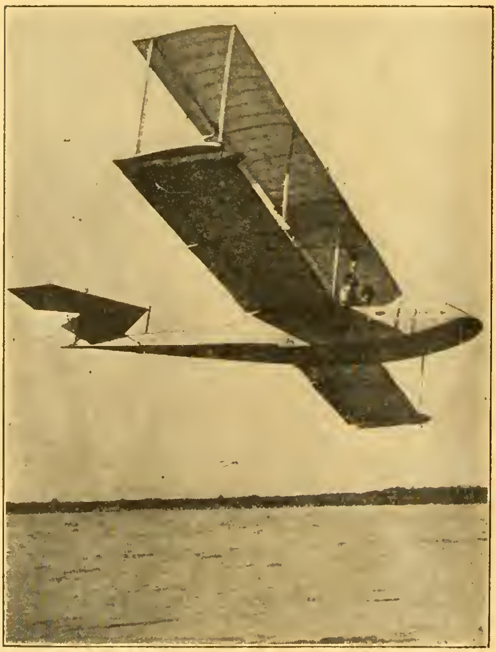
1,070,576—Frank M. Bell, El Paso, Tex. Com pressed air engine starter with the tanks used a floats; vertical fins on top plane; wing sections oper top and bottom, under fins and horizontally dispose propeller in line with openings, two engines drivin concentric propellers.

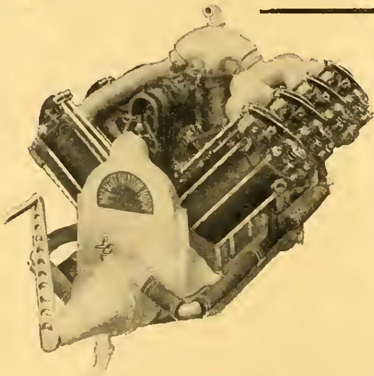
1,070,625—Leon W. Perry, Denver, Colo., STA BILITY device in which electrical contacts are mad by a ball on an oscillatory runway.*

1,070,782—John E. DeBaun, Spring Valley, N. Y FLYING MACHINE in which bag-like devices ope and close alternately.

1,070,856—August L. Batsleer and Samuel I Thomas, Manchester, N. H., ANCHORING device fo holding aeroplanes, which may be tripped by th aviator himself.

1,070,972—George W. Lynn, Detroit, Mich., PRO PELLER with adjustable controlled pitch blades an means to control pitch of blades by an operating roc bell-crank lever, etc.





AERONAUTICS

Vol. XIII. No. 3 SEPTEMBER, 1913 25 Cents

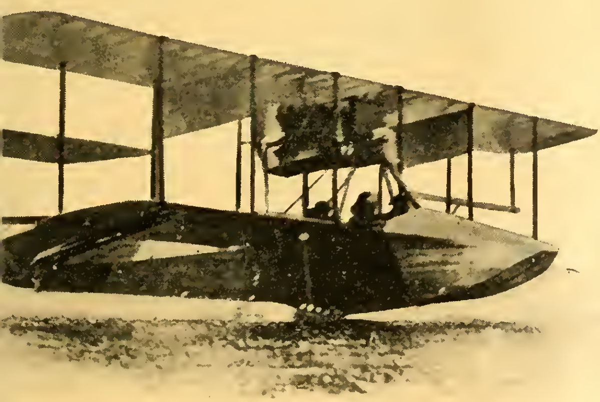
ASK US TO SEND YOU

Post Free

The Book of the **CURTISS**

The Original

FLYING BOAT



Used and Endorsed by Men Prominent in Sport, Business, Society

"Curtiss Training Schools," "Curtiss Motors," "Curtiss Aeroplanes,"
are other booklets any of which we are glad to send on request.

Curtiss Aeroplane Company, 21 Lake Street
Hammondsport, N.Y.

The New Benoist Flying Boat in Action

← BENOIST ←

PLANES hold the following records:

World's long distance hydro record with one passenger.
World's long distance hydro record with two passengers.
American endurance record, aviator and three passengers.
Have more world's records than all other m'f'rs combined.
The first successful Tractor Biplane built in America.

*Records indicate superior efficiency.
Why not get an efficient machine while you are about it?*

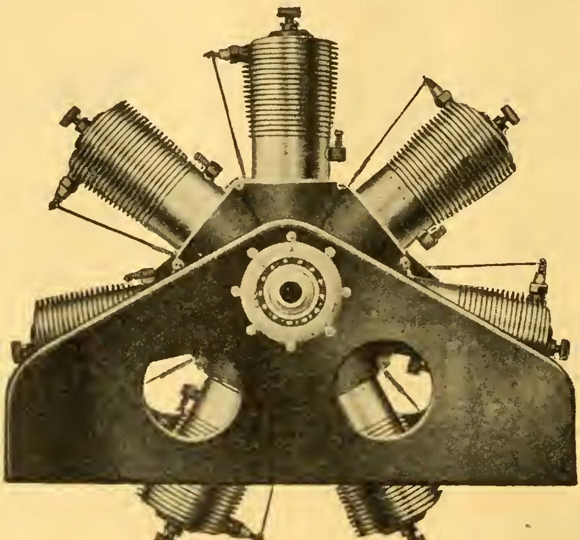
BENOIST AIR CRAFT CO.
6628 DELMAR BLVD. ST. LOUIS, MO.

---

50 H. P.
160 POUNDS

GYRO MOTOR

80 H. P.
207 POUNDS



Built of Nickel Steel and Vanadium Steel Throughout

Endurance Flying Record to Date, 4 hrs., 23 min.

From the
LONDON AERO-DROME, HENDON
of Aug. 23rd. 1913

Still there was never any doubt about his (Beatty) ability as a flyer, or about the pushing power of his **GYRO ENGINE,** which for its size is **ONE OF THE MOST POWERFUL IN ALL HENDON**

Send for Catalog

THE GYRO MOTOR COMPANY, 774 Girard Street, Washington, D. C.

MAGNALIUM

12 1-2% LIGHTER, 15% STRONGER

AND OVER TEN TIMES AS TOUGH AS THE BEST ALUMINUM CASTINGS. WEIGHS ONE-THIRD AS MUCH AS IRON.

FOR CYLINDERS, PISTONS, CRANK CASES, SOCKETS AND OTHER AEROPLANE FITTINGS

G. A. CRAYEN & CO.
81 NEW STREET, N.Y.C.
METAL DEPT.
MORRIS R. MACHOL

HYDROS

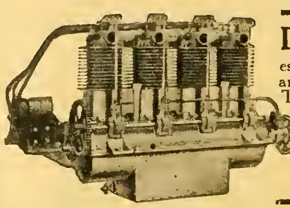
BUILD YOUR OWN

Over 100 complete drawings. Scale 1" to foot; some full size Prints 28" x 36"

ONLY COMPLETE PRINTS EVER SOLD

$8.00

AERONAUTICS, 122 East 25th St., New York



DON'T write us unless you are interested in a reliable, efficient and economical power plant. That is the only kind we build. Four sizes.

Reasonable Prices

Kemp Machine Works
Muncie, Ind.


This Makes Your 'Plane a Success
A GOOD engine properly supported by a Perfect Ignition System—a high-class, dependable and efficient Magneto, the right kind of Spark Plugs and the highest grade of Cable.
Specifying Bosch
gives you all that and besides you have evident ease in knowing that all your flights will be free from the dangers of faulty ignition.
Suggestions and Literature Sent on Your Request.
Bosch Magneto Company
201 W. 46th STREET :: NEW YORK

Aviation in France

BY LEICESTER B. HOLLAND

IN actual development of the aeroplane, France is undoubtedly considerably ahead of the United States, but this is due neither to great superiority on the part of the constructors and aviators, but chiefly to the fact that France is in a continual fever of militarism, a condition not altogether to be envied. Ever since 1871 public opinion in France has had its eyes fixed on Germany, either in fear of further invasion or in hope of revenge for the loss of Alsace-Lorrain, and the aeroplane has now suddenly appeared as a magic weapon by which the national honor and prestige is to be restored.

It is not the government alone that is buying aeroplanes for the army, but well-to-do individuals, clubs, newspapers, actors and actresses, and even schools present them to the national flying corps. Those who can not afford to present a machine themselves, contribute to the general subscription for "aerial defense."

Great interest is also taken in all things connected with military aviation; demountable hangars, aeroplane workshops mounted on auto trucks, rapid fire guns for use on aeroplanes and on automobiles for use against aircraft are of absorbing interest to the French nation and occupy a large part of the space in aero exhibitions. Wireless experiments, too, have been very successful, though only in sending messages. I do not know of any great success attained in receiving wireless messages on aeroplanes. The result is that with such a steady inflow of orders the manufacturers are enabled to keep fairly large plants going and run their business on a scale and with a degree of competition and progress quite impossible in this country.

But if military aviation were not existant in France the conditions there would be practically what they are here, for aviation has not yet developed to a state of commercial utility while as a form of sport the French are perhaps even less interested in it than we are ourselves.

Aeroplanes are not being bought by individuals. The majority of those flying are officers of the army and such civilians who fly are demonstrators in the employ of the manufacturers. Of the makers themselves, none are flying save the Farmans. Bleriot, even, has given up flying.

It seems quite possible, therefore, because the military development is denied us in this country, that we will be forced to develop along the commercial and sporting side; and this, after all, is the more permanent though slower development. We have already developed the hydroaeroplane, the ideal machine for sport, into the "flying boat," a type not unknown in France, but far ahead of the great majority of French hydroaeroplanes which retain the old form of a land machine fitted with floats instead of wheels.

France has been known as the country of monoplanes while the biplane was called the American type. This distinction can no longer be applied as biplanes are coming more and more into general use for "all 'round" work. The biplane is generally considered safer and more stable and the monoplane's development is being confined to speed lines. The latter is not a weight carrier, it is not adaptable to the purposes for which a biplane may be used. In it every effort is being made to increase speed. "Monococque" construction is becoming more and more common, every bit of wood and metal is given stream line form to reduce head resistance, every ounce of weight is being eliminated, increased power is being used and the wing surfaces are being studied for speed effects.

It seems quite possible that the eventual type will be between the monoplane and biplane, the "sesquiplane" if one may so term it. For the biplanes are approaching the monoplanes in a way. Eiffel has shown in his laboratory that the lower plane carries, approximately, only a third the weight carried by the upper and advises reduction in size of the lower. This is being generally done. The lower plane gives increased stability over that of a single plane and has considerable use for structural reasons, while the efficiency of the machine is increased over that of the old biplane. Where warping systems are used, however, in the Breguet and Astra, the lower plane still remains the same size as the upper. A feature of the Breguet machine is that the entire wings are very flexible, even the control cables have springs introduced in their lengths and beyond a certain point the operation of rudder and elevator and warping is impossible. This produces a machine which while "smooth" and indifferent in light wind eddies, is rather difficult to manage under severe conditions. In general the manufacturers are building their wings less rigidly, almost all having flexible trailing edges and some being positively "S" shaped in order to allow gusts to slide more easily past.

Another interesting type that is being developed is the "canard" or tail-first machine; this may be either a monoplane or biplane. Of this genus the original Wright is considered the prototype though strictly speaking the Wright had no tail at all. The number of experimental machines of this kind has increased rapidly of late, the Voisin biplane being the best known. Bleriot built two, the

first a failure, the second is being tried out. Lieutenant Blard has been flying fairly successfully at the army station of Chalais-Meudon with a machine built along these lines, and another of all-welded metallic construction is being manufactured for general sale by Besson. The advantages claimed for this type are, greater longitudinal stability, greater field of vision, the pilot being in front of, rather than behind the main wings, and greater security in landing, the centre of gravity being over the rear rather than the front of the skids.

The tandem plane machine is coming for its share of experimentation. Drzewiecki has built a tandem monoplane with the front plane nearly as large as the rear one, with the centre of gravity approximately in the middle of the fuselage. The front and rear planes are of different sections, the front being normally at 8 degrees and the rear one at 5 degrees, or 3 degrees negative to the forward plane. On account of the difference in section and area of the front and rear surfaces, the total lift of the forward surface varies less rapidly than that of the rear surface when the angle of incidence changes. In case of a sudden dip, the difference in power of the two units is reversed. That under the forward plane becomes preponderant and rights the machine. Lateral stability is maintained by changing the angle of incidence of either half of the front plane. (See in AERONAUTICS for February, 1913, article by Captain W. Irving Chambers.)

This assurance of longitudinal stability seems to be the most important step in the direction of security in aeroplanes, as the majority of accidents seem to be due to a loss of headway and consequent "slipping" of the machine, in mounting too suddenly or to "engaging" the rudder in descending too rapidly. Farman has a system of control levers by which the control acts with less and less efficiency the further the rudders are turned toward one extreme or the other and the Doutré stablizer has proven very efficient and is being considerably used. This instrument consists briefly of a plate placed at right angle to the direction of flight. Any sudden increase of relative speed through the air causes increased pressure on the plate which pushes back a piston in a cylinder which in turn operates a servo-motor and controls the elevator. A decrease in pressure allows the plate to be pushed forward by a spring when a similar operation takes place and the elevator automatically heads the machine down. Two small weights by their inertia actuate the piston in the same manner when there is any such things as "holes in the air" which would not effect the wind plates (fully described in AERONAUTICS.

The chief effort that is being made in development along lines not strictly military is due, more than to any other person, to the present president of the Aero Club de France, Deutsch de la Meurthe. He is an immensely wealthy man, has given large sums to aeronautics in prizes, for achievements in dirigibles as well as aeroplanes, and established the Aerodynamic Laboratory at St. Cyr. He has interested himself in encouraging development of weight carrying machines and it will be remembered that he had Bleriot build him an aeroplane taxi, with an inclosed cab body, with every convenience found in the automobile taxi, except the indicator of the fare. His latest machine is one he had built for him by Voisin. It is a huge hydro called the "Icaire" capable of carrying eight to twelve passengers.

NO GREAT PROGRESS SINCE 1903

I am not quite so keen for aeronautical literature as I was a year or more ago, because it seems to me that no adequate progress has been made since the Wrights pointed the way. The amount of flying is great enough, machines are better built, motors are more reliable and more powerful in proportion to weight, but after all, the Wright principle of construction has not been materially improved upon except in such manner as experience would naturally suggest and the essential features remain unaltered. This either speaks pretty well for the Wrights or not very well for those who have followed in their footsteps.

My own belief is that the aeroplane as at present constructed has not nearly reached its greatest stage of development either in theory or practice. I have not lost interest in the future of aviation, as I believe there is very much yet to be accomplished in the way of improvement. What is most needed now is a new race of aviators. At present those aviators who are most in the public eye, seem to care nothing for their occupation except as a temporary stepping stone to enable them to reach as soon as possible a stage of existence where they wont need to risk their own necks in the air. It is the machine itself that is mostly to blame for this state of things. When the ideal flying machine makes its appearance, aviators wont be so anxious to retire from their aerial experiences, but will enjoy them so thoroughly that they will never want to quit. Neither will the enjoyment of these experiences be confined to the young and the strong. It will be common for old men and even invalids to get the benefit of the upper air without a suggestion of fear, and I expect to see this consummation, although I am in my sixty-seventh year. I can not myself claim to have contributed very much to the promotion of aviation except as a passenger on two occasions when I certainly did make some contributions, in a way. I covered about forty miles all told with a noted aviator who soon thereafter lost his life, doing stunts, I think, which his better judgment did not approve,

—Subscriber.

Technical Talks

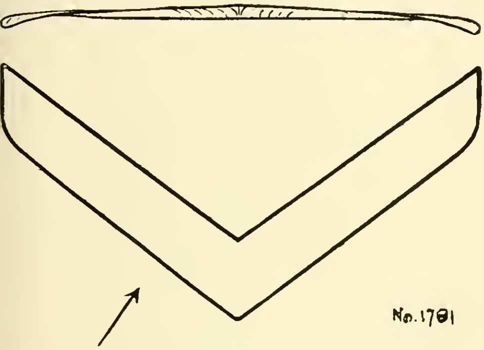
BY M. B. SELLERS

THE DUNNE AEROPLANE

In view of the present public interest in the Dunne aeroplane, I shall give a brief explanation of its stabilizing qualities, based chiefly on material contained in Mr. Dunne's communication to the Aeronautical Society of Great Britain (Jan. 29, 1913).

As is generally known, the machine has retreating wings, forming a V in a horizontal plane. These wings are cambered as though they formed the roof of a cylindrical tunnel, running diagonally lengthwise of each wing, so that the crown is nearer the rear side of the wing at its outer end; the diameter of the tunnel preferably diminishing toward the wing tip.

Thus, the wing presents a quasi warp; the chord of the outer end being at a negative angle in normal flight as shown in Fig. 1, which shows a front and plane view.



No. 1781

Fig. 1

Now the relative wind, due to a side gust, will come across the port or starboard bow, and will blow more across the tunnel in case of the windward wing and more down the tunnel on the leeward wing as shown in Fig. 2 (in which the wind is supposed to come from the observer's eye toward the picture). It is obvious that the windward wing will encounter greater resistance than the other, and the machine will at once swing around to face the wind. This device, therefore, possesses greater weathercock stability than would be conferred by a large vertical tail plane on a conventional machine, besides acting more quickly.

Considering, now, longitudinal balance: the forward and central part of the aeroplane constitutes, with the lateral parts, a "longitudinal V"; in fact, every portion of the wing bears this relation to the part adjacent. When the machine rears, the lift on the after positive portions of the wings increases more rapidly than that on the forward portions, because the angles of attack are nearer zero; this causes the centre of pressure to move backward along the wing; at the same time the negative portions are being reduced in area; all of which promote longitudinal stability.

Finally, we have what Mr. Dunne calls the reserve tangent device. If the vectors (representing the resultant pressures) are drawn at points along the wing, say at each rib, those in front will slope backward, and as we go toward the wing tip the vectors will become shorter and slope more and more forward; and in normal flight the resultant of them all will slope backward.

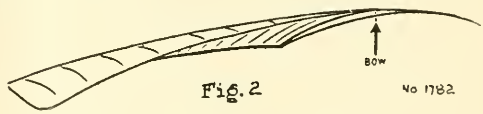


Fig. 2

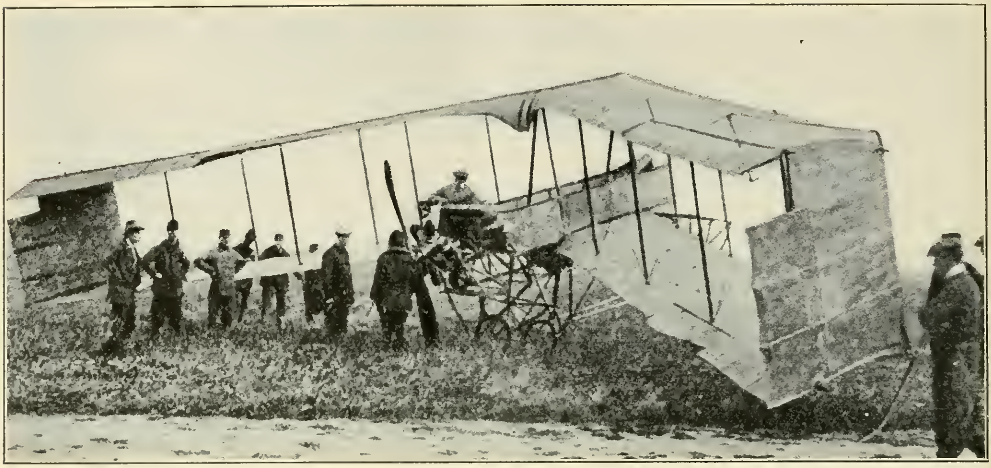
No 1782

But if the machine loses headway, and therefore begins to sink, the angle of attack will increase, the rear pressures will increase more rapidly than those in front, and the centre of pressure will not only move backward but will incline forward, thus furnishing a propelling component. Instead, therefore, of diving like a conventional aeroplane, it will be able to accelerate with only a gradual descent. Mr. Dunne states that the effect this has on the smoothness of path in high winds is simply amazing, and that the machine maintains itself under full control at apparently impossible angles. (I do not entirely agree with the above explanation.)

Mr. Dunne shows mathematically what occurs after the machine has been forcibly tilted sideways, but I shall not give that here. The machine first commences to circle toward the low side, but at once the outer wing tends to lag and be depressed, due to the faster moving negative tip, and to the angle at which the different parts of the wings meet the air in describing the curve. The machine will, therefore, tend to level up, and straighten out the curve. In order, therefore, to maintain the bank and curve, ailerons must be used. If turned by an ordinary rudder the machine depresses the *outer wing*.

As to lateral stability, or steadiness, the coning of the wings at the front produces a slight positive dihedral, while the tips present a negative dihedral. These, under the action of a side gust, oppose each other, and tend to damp out incipient oscillations, and it is found that in ordinary side gusts, little rocking is produced.

The negative surface exposed decreases with increasing angle of attack. If a strong side gust initiates a windward roll, it will also increase the angle of attack and so *decrease* the negative surface, thus checking the roll; and vice versa.



The 1913 Dunne.

Finally, an aerofoil presenting its long edge to the wind, receives at small angles, greater pressure than if exposed the other way; but at large angles, beyond 30 degrees, it receives less pressure. Now, a side gust encounters the windward wing more on its long edge, and the leeward wing more endwise, therefore, the pressures are greater on the windward wing. But if by an excess of overturning forces, the machine is being upset sideways, the preponderance of pressures on the windward wing will diminish as the inclination increases, and, beyond 30 degrees the pressures on the leeward wing will be the greater. It would seem, then, impossible to be blown over much beyond 30 degrees no matter how violent and unevenly applied the gust.

Though we may not concede all that Mr. Dunne claims for his machine, we must admit that it possesses remarkable stability.

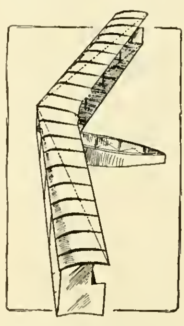
THE DUNNE RUDDERLESS MONOPLANE

Patrick Y. Alexander once said: "Dunne is one man you should watch carefully." J W. Dunne began active work on gliders in 1908 in secrecy.

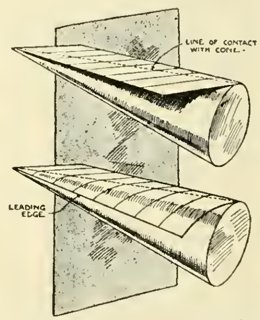
In 1909 Dunne started on his own account and built a heavy biplane, and, after many changes, in the fall of 1910 he flew before Orville Wright and Griffith Brewer, letting go the levers and writing notes. (See AERONAUTICS, March, 1911, pages 81-83 for description and text of patent.)

Then work on a monoplane was begun. The monoplane had its trials in the summer of 1911 and was along similar lines. Little was heard of this.

Dunne went back to his biplane, lightened it and began flying it with N. S. Persival as pilot, in the summer of 1912. Many passengers were carried, among them Commandant Felix, who was attracted by the monoplane and who induced the Nieuport firm to lend a Gnome motor. "I saw the apparatus fly once, then mounted it without hesitation, made the first flight with levers in hand and manouvered to test the apparatus, then a second flight during which "I let go everything, and at the end of a moment stood up on my seat and had great trouble to avoid dancing a jig for joy. The next day I started for France."



Diagrammatic sketch illustrating the varying curvature of the ribs in the wings of the Dunne biplane. The dotted line represents the line of contact with the imaginary cone upon which the wings are drawn out. Aft of this line the wing surfaces are flat.



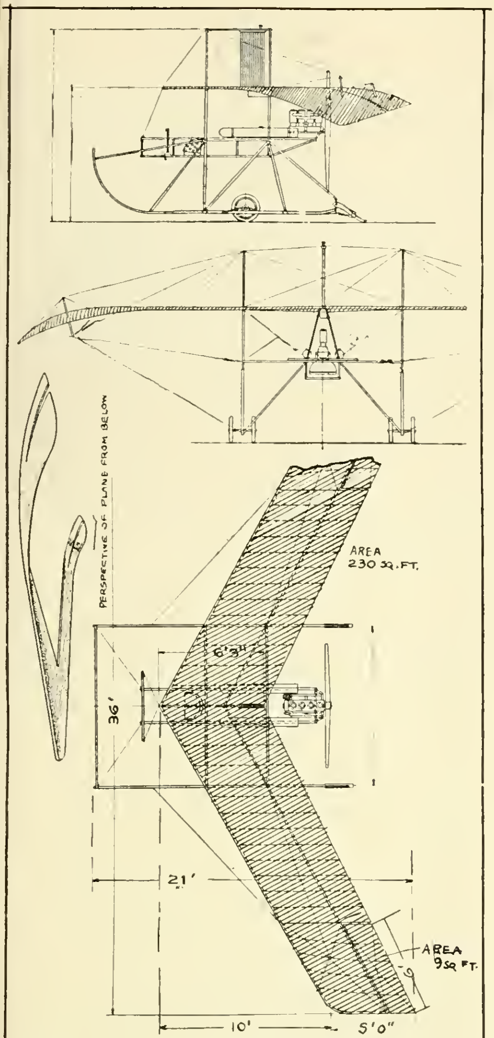
Sketch illustrating the use of a paper model in order to explain the shape of the wings on the Dunne aeroplane.

1783

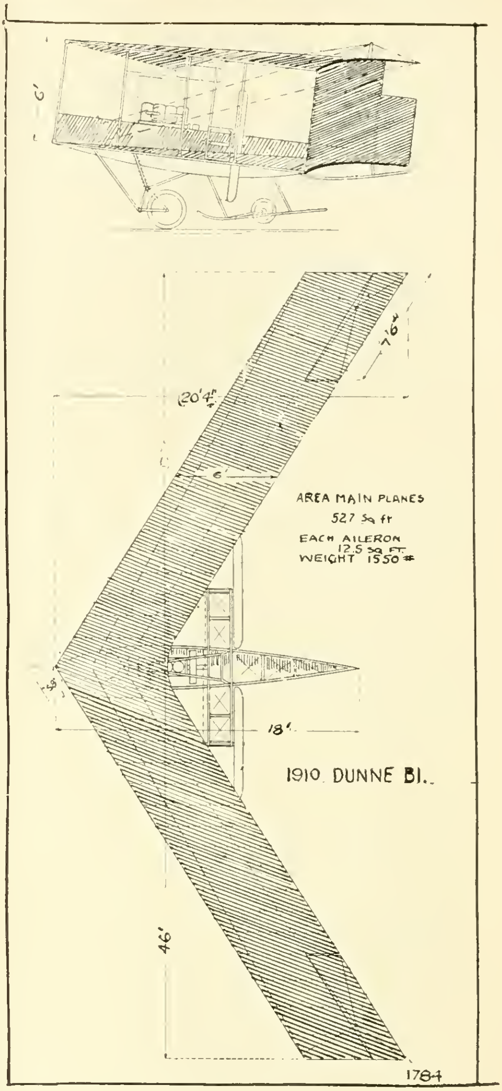
Readers will remember the successful flight just recently made by Felix from London to Paris in the latest Dunne biplane. "The apparatus stood there every possible test: hail, wind, heat waves met with in the country at 1500 metres height and difficult landings both hard and brutal, the machine acted admirably everywhere. I flew in very doubtful weather at Villacoublay, and the next day in really rough weather before my superiors, who, according to their habit desired to form their own conclusions, says Julien Felix.

Ailerons are necessary for steering as there is no rudder or elevator. These ailerons are used for both purposes.

(References: Aeronautical Journal, January, 1911; Flight, June 24, 1911; Flight, June 18 and 25, 1910; British Aero, July, 1911; Flugsport, September 6, 1911; AERONAUTICS, March, 1911.)



1911 DUNNE MONO.



1910 DUNNE BI.

Recent doings of the Dunne machine are of interest. After flying over Paris and giving demonstrations at Villacoublay, during one of which Commandant Felix got out of the seat and walked along the lower wing (on the side with, not against, the torque couple), he flew the machine to Deauville, where he has been flying consistently. Once, while flying at Deauville, he gave an interesting demonstration of what could be done in emergencies. Hearing the engine missing, he locked the levers, walked back to the engine, a distance of over 12 feet, adjusted matters to his satisfaction and then returned and resumed control, the episode taking two or three minutes. It is not known what the trouble with the engine was, but it is believed that it was the ignition wire to the back-plate. The centre of gravity must have moved nearly a foot.

The present Dunne machine is operated by two levers which actuate the ailerons situated at the extremities of the upper and lower planes. Moving the two levers forward or back makes the machine descend or ascend respectively. When steering to the right, the right hand lever is drawn backward and the left hand one pushed simultaneously forward. These actions result in the flap on the pilot's right having its trailing edge elevated while that on the left has its trailing edge depressed. Each of the wings spreads 7.9 metres, chord 1.65 m. spaced 2 metres apart. The ailerons in the upper plane measure 2.25 m. by 75 cm.; those in the lower plane, which are not out quite so far, measure in spread 1.45 m. The fuselage is 5.40 m. long, height at rear 1 m., at the seat 1.80 m.; greatest width 80 cm. The chassis is novel. There are skids under each wing tip, and at the fore and aft extremities of the fuselage. The running gear consists of two wheels. The motor is an 80 H. P. Gnome and the speed averages 80-90 K. P. H.

Benoist "Type XIV" Air-boat

The new "type 14" Benoist air-boat differs in detail only from the old type 13 boat built by that company in the latter part of 1912 and flown the first time successfully on the last day of the year. (Full drawings and details in January, 1913, AERONAUTICS.)

The new type is constructed as the old with the motor down in the boat, and, of course, is still chain drive. The original lines of the boat part are still preserved, only being built wider to make seating capacity for two side by side.

The boat proper is twenty-three feet long, the direction rudder extending two feet further back. The hull is twenty-two inches high at the step and carries practically the same height up to and including the passenger seat and control lever space. Step is five inches deep.

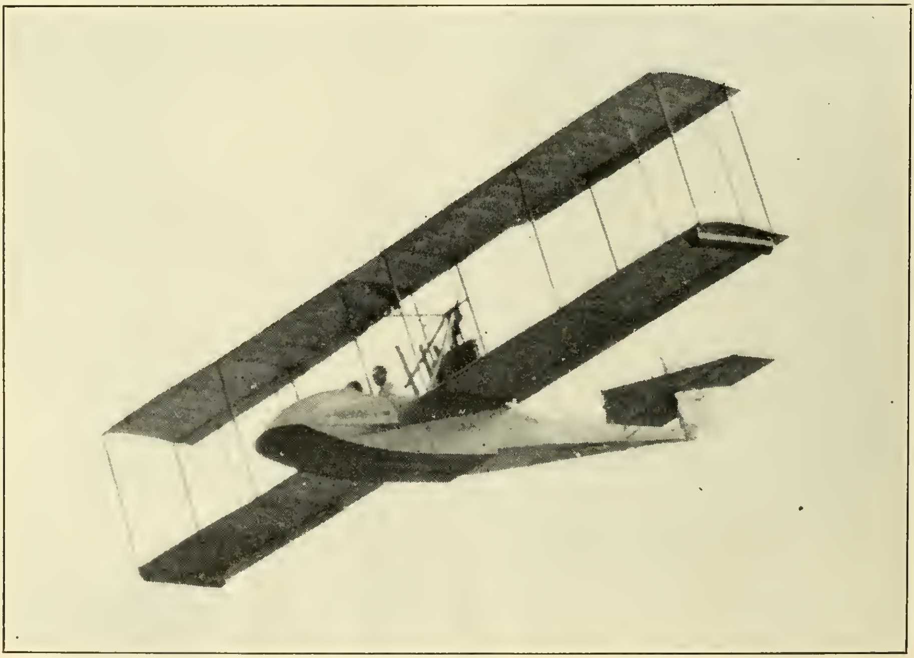
The air and water rudders are constructed integral, the lower part of the air rudder being made of wood and extending down into the water. To make the water rudder efficient when machine is moving slowly or the tail is high it is extended six inches below the stern of the boat and protected by a sprag which is simply an extension of the small centre board placed under that part of the boat.

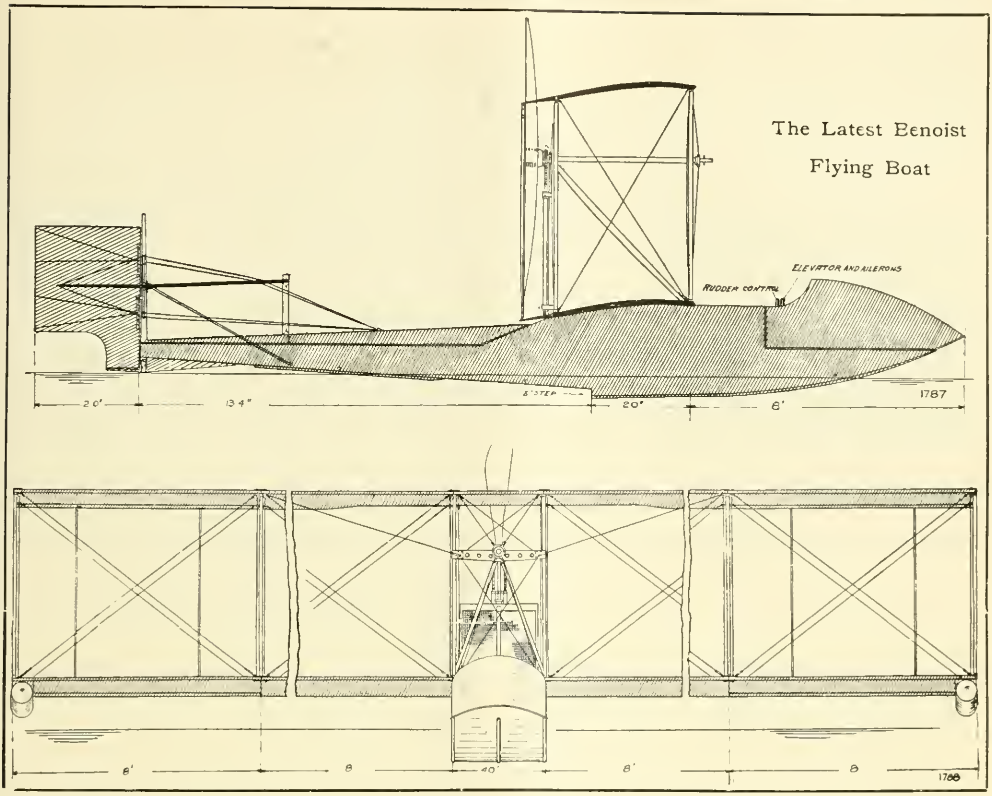
A larger gap between the main planes is employed than in the regular Benoist tractor machine, it now being six feet..

The Benoist company was the first to build a successful flying boat with the motor down in the hull. This was adopted unanimously by the engineering board, consisting of Tony Jannus, Hugh Robinson and Tom Benoist, after repeated tests for efficiency both in water and in air; great attention being given to the factor of safety regardless of whether the machine was to be used as a boat or aeroplane The findings in favor of the motor in the hull were as follows: "1st—The motor in the hull made the machine much more stable in the water, eliminating the trouble experienced by the other builders in keeping the machine from turning over when the water was a little rough or a light wind blowing, when the machine was anchored or not moving forward. 2nd—This also added greatly to the apparent safety of the machine. The same objections urged against the motor up high between the planes back and above the aviator and passengers holding good in the flying boat as well as in exhibition machines. The Benoist company developed the first successful tractor biplane in this country, and as this style of plane has become very popular the last two years among exhibition men because of its much greater factor of safety in comparison with the propeller-driven machines it was decided that the motor must not go up high under any condition."

The motor is placed on two strong beams running parallel with one another practically the full length of the boat. These beams are made strong and heavy and add materially in strengthening and stiffening the boat fore and aft. They are sixteen inches high in front of the step and, under the motor, seventeen feet long and two inches thick.

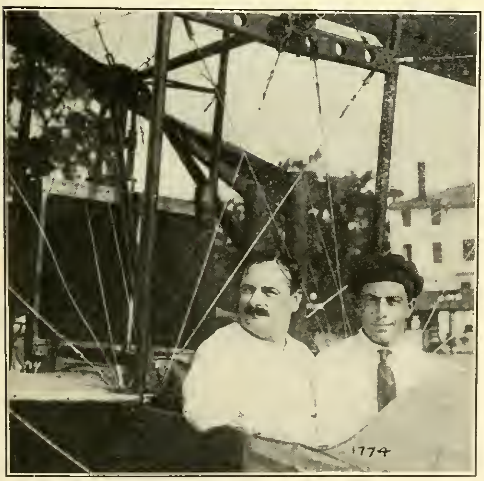
The motor drives a propeller 8½ feet diameter by 5.50 feet pitch. These propellers are constructed by the Benoist company, being brought up to the highest state of perfection after repeated tests and experiments. A





The Latest Benoist Flying Boat

½ inch by ⅜ inch by 1 inch Diamond roller chain is used to transmit the power of the engine to the propellers, the chain running in tubular steel guards to eliminate any possibility of becoming entangled in wiring or propeller in case of high speed, breakage, or strain.



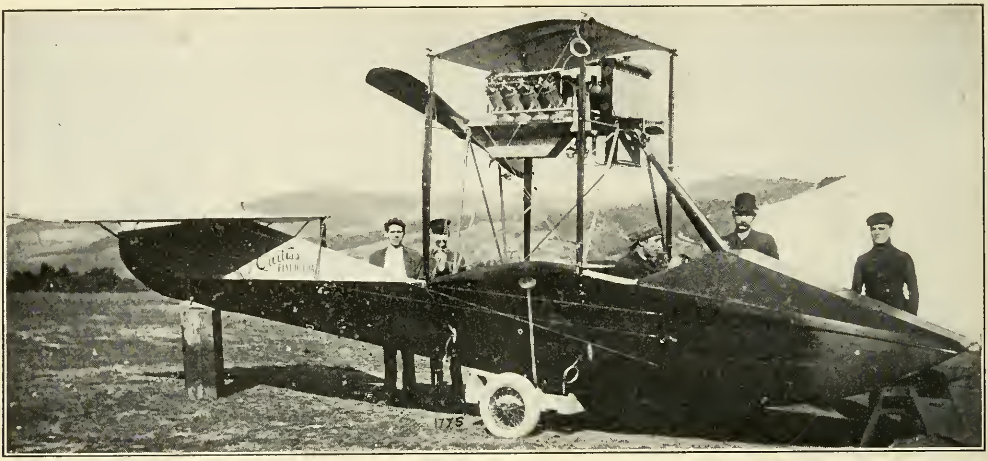
A honeycomb radiator of their own manufacture is used with 513 sq. in. of presented surface on the 75 H. P. Roberts motor and 480 sq. in. on the Sturtevant 70 H. P. motor. The radiator is placed above and back of the motor just in front of the drive chain.

The shaft that carries the propeller is mounted between the main planes eighteen inches below the trailing edge of the upper plane. It took a great deal of experimenting coupled with some ingenuity to evolve a system of struts and wires to carry this shaft that would take up the strains, both thrust and tortional. However, this was overcome after many experiments, and a system both light and durable, substantially as indicated in the drawings is used. Both ends of this shaft are carried by combined thrust and radial ball bearings; the distance rod or chain tightener also using ball bearings at each end.

The regular Benoist tractor planes are used, differing only in gap and length of separate sections: Spread of main planes, 35 feet 4 inches; gap, 6 feet; length of sections outside of engine section, 8 feet; chord of wing 5 feet; camber 2½ inches; greatest depth of camber, 21 inches back of front edge: wing area, 337 sq. ft.; ailerons, four, each 8 feet long and 20 inches wide. Wings covered with No. 2B Naiad aero cloth. All guy and control wires Roebling special stranded cable.

This boat equipped with either a Roberts or Sturtevant motor will carry two passengers beside the aviator, and is capable of carrying seven hundred pounds of useful load consisting of passengers, gasoline or freight.

The motor is cranked by a lever and ratchet arrangement on the forward end of the propeller shaft.



Curtiss "English" Flying Boat

Certainly there is nothing slow about the development of the Curtiss flying boat. Last month, as in previous successive months, a new model was described in these columns, and here, almost before the varnish on its predecessor has had time to set, comes another new craft with still further modifications.

This time it is a really truly four-passenger craft along the same general lines as the now well-known Curtiss model. For lack of a more appropriate name we may refer to it as the "English" flying boat, because it is the machine shipped to Mr. Curtiss in England for the demonstrations already arranged for there. It also may be used for the proposed Anglo-American flying boat contest; the Sopwith air-boat being mentioned in the despatches as a probable competitor.

Instructor Francis Wildman of the Curtiss training camp tested the new machine September 15-16, and reports indicate that this boat marks some distinct advances over any of the previous models. On the first "jump," which Wildman made alone, the boat left the water within a hundred feet of the starting point. It proved a quick climber and a steady flier. About quarter of an hour was devoted to this preliminary test, during which Wildman tried the machine at every angle. Returning to the landing stage Wildman, who weighs 158 pounds, took aboard Henry Kleckler, weight 168 pounds; Mortimer Bates, 155 pounds; Harvey R. Kidney, 138 lbs. His flight with these four aboard lasted nearly an hour, during which an altitude of approximately 2,000 feet was attained. Wildman was anxious to attempt the establishment of an official passenger-carrying duration and distance record, but like many other really competent flyers, he never has troubled to fly for a pilot license so that his record would not be "official." Photographs taken during this four-passenger flight show the handiness of the new boat both on the water and in the air. The machine is shown steeply banked on a short turn near the water, as well as climbing on turns; good evidence that even when carrying 700 pounds the craft is not overloaded.

Repeated trials over the measured mile showed an average speed of exactly 60 M. P. H. The average mile with the wind was 55 seconds, against the wind, 1.05.

During the two days devoted to the tests Wildman flew several hundred miles with the new machine, trying it on different occasions with two, three and four passengers. Some of the old hands at aviation were inclined to be skeptical about the desirability of the after cockpit until they tried it out. Then all were unanimous in declaring it the most comfortable place on the "ship."

"I never fully realized the luxury of aerial travel until I rode in the back of this flying landaulet," said one experienced airman after a long flight. "There one seems indeed 'monarch of all he surveys.' Wildman told me to make myself comfortable without giving a thought to the balance of the machine and I proceeded to do so. I lounged back in one corner, smoked a cigarette and enjoyed the scenery. Then it occurred to me that I had long been curious as to the effect of air pressure on different parts of the machines when in action, so I spent several minutes watching for vibration in the cables or surfaces. The yellow wings spread out on both sides of me, smooth and solid as a floor. There was no perceptible movement in them, the cables were motionless; none of that vibration which is said to make a 1/16 cable equal in head-resistance to a 1 inch upright was apparent. I changed at will from one side of the cockpit to the other, without any noticeable effect on the balance of the ma-

chine. Finally I stood up and leaned over the forward edge, then shifted to the after side. It was always the same,—nothing to disturb the feeling of absolute stability."

Improvements are shown from keel to upper surface. The hull, which is of solid mahogany, polished like a piano case, has six inches more beam than any previous model, a decided Vee-bottom, with a steel-shod keel extending beyond the step. Mahogany is used for planking the bottom, but is covered with sheet Duralumin, and mahogany lines the double cockpit. A new style of construction in the hull has resulted in greater strength, though the boat weighs considerably less than the canvas-covered models built for Jack Vilas, J. B. R. Verplanck, and some others. Increased comfort for the passengers is secured by the raised deck.

In the wings and ailerons further changes are noticeable. Considerable weight is saved by the new one-piece construction, and with no sacrifice of strength. The spread of the upper surface has been increased to 41 feet, while the lower one measures 30 feet. Instead of being secured by a diagonal brace as heretofore, the upper extension is trussed above and below, and the outer end of the aileron is supported by a post descending from a socket near the end of the upper plane. Surfaces are of unbleached linen, made semi-transparent by the new Curtiss waterproofing preparation. No changes of any moment have been made in the tail structure. Like those in the U. S. Navy's "C-2," described last month, the horizontal members are higher than in former Curtiss machines, but the area and general dimensions are the same.

The hull is 25 feet long, with a beam of 50 inches, and an extreme depth of 46 inches. Made entirely of dark Honduras mahogany, fastened throughout with copper rivets and outside with round-headed brass screws. Both forward and after cockpits are ceiled and panelled in mahogany. Seats are upholstered in dark brown corduroy, and after cockpit seat-back is upholstered. Metal fittings are finished in maroon enamel. Center panel of forward deck folds over to form rubber covered and cleated gangplank. Entrance to after cockpit is through the forward one, engine supports having been designed to allow room, and to decrease head resistance of machine. Hull is mono-hydroplane, with Vee-bottom, keel extending beyond the step, so as to form a substantial support when boat is run high and dry on runway or beach.

Design of the superstructure differs considerably from previous models. Wings are of one piece. Upper wings have a spread of 41 feet; lower wings measure 30 feet. Chord, 61 inches. Wing structure is lighter and stronger than formerly. Beams are laminated and tapered, fastened at joints with copper straps. No holes are bored in the main beams. Ailerons have been increased in size and now measure 12 feet long by 3 feet deep. These are hinged on the outside rear uprights, and steadied by struts depending from the outer extreme of each upper surface. Each aileron is wired independent of the other and in case of the disablement of one the machine can be handled by the other.

The power plant comprises one of the new Model O-X 90-100 H. P. Curtiss motors, with a new style of radiator which is of smaller area than the old ones but of greater capacity. An 8 feet 6 inches Curtiss propeller is attached direct. Main fuel supply is from two 20 gallon tanks fitted into the corners of the after cockpit. Air pressure forces the gasoline from these tanks to a 3-gallon tank located on the motor bed, whence the gasoline flows by gravity to the carburetor.

Weight of this boat is approximately 1,400 pounds, speed 60 M. P. H.

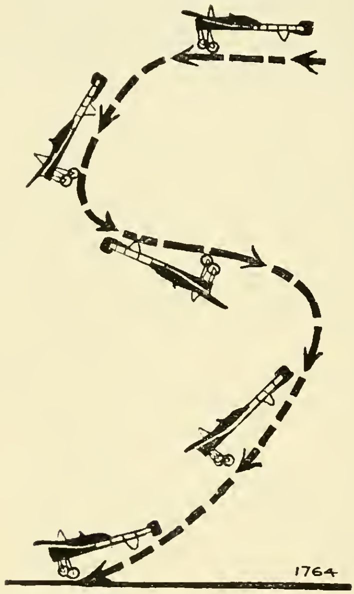
An important use of the aeroplane would be picking out headquarters, the enemy's commanding general and important encampments like that, and by using shrapnel, a large shell weighing 500 pounds with high explosives, and being able to drop it within a square of 120 feet, I think you could make it very uncomfortable for the commanding general. I think that would be an important use of the aeroplanes. Against fortifications—I firmly believe that 500 pounds of nitrogelatin placed near a barbette disappearing gun carriage would put that completely out of service. If dropped on a mortar battery, I think it would temporarily at least put that out of order, and especially the range-finding system. The accuracy of these guns depends entirely on the range-finding system. These systems are screened as much as possible from the sea in the seacoast fortifications, but they cannot be screened from the air, and I think it would be very readily put out of business, and when the range-finding system is put out of business the battery is put out of business, at least until it is repaired.

Lieut. R. E. Scott.

New Developments in Aeronautics

HOW PEGOUD DIDN'T LOOP THE LOOP

The newspapers widely heralded the reported feat of the French aviator Pegoud, with a Bleriot monoplane, in "looping the loop." As a matter of fact, he did nothing of the kind. Wonderful as his feat was, which he repeated for the benefit of the military, he merely headed downward in a vertical line, and with his elevator turned the machine on its back for an approximate distance of 400 yards for 15 seconds. Again with the elevator, the machine was brought to the vertical position again and leveled out. Of course, Pegoud was strapped in. It will be remembered by readers of AERONAUTICS that a similar performance was done involuntarily by Capt. Aubry in a Dep. It is reported that Bleriot hopes to see Pegoud turn his monoplane over sideways in the air and back again, instead of in the vertical direction.



In 1905 Maloney, who was employed by Prof. J. J. Montgomery to operate his gliders in free flight after being released high in the air, once pressed too hard on the "stirrup" which warped the wings, and made a side somersault very much like one turn of a corkscrew. Wilkie, another operator, not to be outdone, said he would do the same, and actually made two side somersaults, one in one direction and one in an opposite, then made a deep dive and a long glide and when about 300 feet high brought the aeroplane to a sudden stop and settled to the earth.

After this, Montgomery changed the machine to allow but plain sailing. (See p. 49, January, 1909, AERONAUTICS.)

In 1911 Lieut H. R. P. Reynolds, R.E., was turned upside down in a Bristol biplane by a whirlwind at a height of some 2,000 feet, and alighted safely, but wrong side up. In 1912 W. R. B. Moorhouse purposely forced the nose of a Bleriot up as far as it would go and then switched off, in an endeavor to force a tail-slide, by way of an experiment. The machine stood still on end, then rolled slightly over sideways and dived, descending without damage. A Maurice Farman, piloted by a pupil, performed a similar feat involuntarily at Eastchurch. Capt. Aubry, on a Deperdussin, also turned a somersault in the air, unintentionally, and survived.

On August 25th Pegoud left his aeroplane at an altitude of about 750 feet and descended in a parachute invented by a man named Bonnet. The aeroplane was left to shift for itself.

After attaining an altitude of about 600 feet, and, facing the direction of the wind, Pegoud was seen to release the lever for liberating the parachute, diving at a slight angle as he did so. Suddenly he was seen to be suspended in the air, while the machine continued on its course alone with its engine running. It rose till, at a height considerably above Pegoud and his parachute, it effected a tail-slide and turned completely over. Righting itself almost immediately it glided at a normal angle to the earth, very little damage being done. Pegoud, meanwhile, was gently lowered into the branches of a tree, entirely unharmed.

The device is constructed by Bonnet, and is kept flat against the rear of the fuselage by means of two spring arms. The pilot is attached to it by means of rubber cords, and can release the arms when necessary with a lever at his side. Oscillations of the parachute when in action are dampened by a hole 14 cms. in diameter, and through the fact that the air can percolate slightly through the silk immediately adjacent to it.

A PRIZE FOR STABILIZERS

M. Henry Bonnet has offered a prize of $200 to the pilot of a machine which shall fly a distance of 20 kil. without there being any intervention on his part in order to maintain balance in either the lateral or longitudinal direction. The rudder may be used for steering, but no warping to nullify its effects on balance is permissible. The tests will take place in a wind having a minimum velocity of 10 M. P. H. A representative of the Commission Sportive Aéronautique will be seated beside the pilot, and will, in consequence, be able to assure himself that none of the controls are manipulated.

CHANGE IN PILOT CONDITIONS

At the last meeting of the F. A. I. it was decided that the conditions under which pilots' certificates are obtained should be altered, though not to any serious extent. The aeroplane pupil must now ascend to an altitude of 100 metres instead of 50 in the height test, and glide with his engine completely stopped.

The dirigible pupil, also, must now make 20 ascents in order to obtain his brevet. This number holds good if he already has one for spherical balloons—if not, 25 ascents must be made.

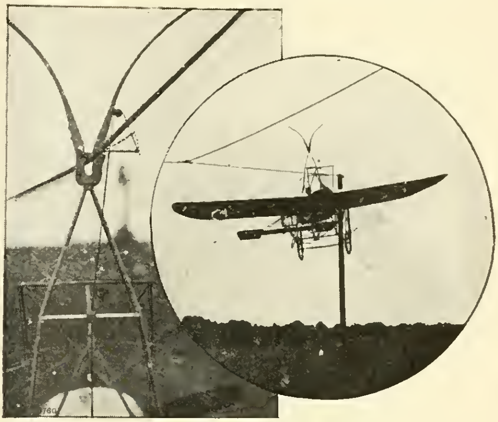
WOMAN DROPS FROM AEROPLANE

European papers seem to have the idea that Pegoud, when he cut loose from his aeroplane in mid-air with a parachute and safely descended to earth, did a new and wonderful feat. And here, since Leo Stevens a year ago, introduced dropping from aeroplanes by parachute, one can almost say this "stunt" is being done daily.

Scarcely more than a line was given in newspapers to the drops made by Miss "Tiny" Broadwick from Glenn Martin's tractor during the Perry Centennial Celebration during August, and now being made as an exhibition feature in the Middle West. The illustration shows how the parachute was attached to the fuselage of the machine.

BLERIOT AERIAL LAUNCHER

The latest invention of Louis Bleriot, already mentioned in AERONAUTICS, may be found of practical value for the launching and landing of aeroplanes on board war vessels suitably equipped. Trials have already been successfully made in the presence of French marine officials. In the trials the apparatus used was an 80 meter long cable suspended in the air by transverse cables at each end attached to posts in the ground 20 meters apart. On the Bleriot monoplane is a V-shaped frame which supports the actual device itself. The aviator, who was Pegoud again, approached the long cable in flight and maneuvered his aeroplane so that the two wooden forks attached to the framework mentioned before came on either side of the cable. Under pressure the catch at the junction of the forks allows the cable to pass by and closes again. The motor is stopped and the machine slows down on the upgrade of the cable. To start from the wire, speed is attained and the catch



released by the pilot's pulling the control, which can easily be seen in the illustration, and the monoplane is free. The left photo shows the catch closed over the wire. The one on the right shows Pegoud just before catching the cable.

EFFECT OF CHANGES IN TEMPERATURE ON CARBURETION

Ordinarily the change is not so great that it will have any effect on the motor. The only time that I have ever noticed this to occur was at Texas City, while maneuvering there with the troops. It was late in the season, about May, I think, and the sun had begun to get pretty hot. I had climbed to 3,000 feet and noticed a bank of cloud coming up. There was a very perceptible change of temperature, beginning at 1,500 feet, being much cooler than on the ground. The carburetor had been adjusted to the temperature on the ground, this usually being sufficient for all ordinary heights. In coming back, after circling over the places that I had been sent to reconnoiter, the cloud bank had moved inland about 10 miles. The clouds were so thick that I could see nothing, so I glided down until I had passed through them. All of this time the motor had been missing considerably but just as soon as I went through the cloud the motor immediately started firing properly. There must have been a difference of 10 degrees or 15 degrees in the temperature.

LIEUT. MILLING.

It is of interest to note that the motor on this flight was a Renault, air-cooled. We can recall a certain air-cooled car which demanded carburetor adjustment night and morning.

It does not take long to teach a man to fly, but it takes a long time to make a military aviator. It is easy to teach a man to fly. They are doing it now at the Wright school in 10 days, and any man can learn to fly in 10 days. To make a man an expert military aviator cannot possibly be done under one year.

LIEUT. ARNOLD.

NEW FAST WRIGHT MODEL

While the school work has been progressing steadily, one of the new model "E," exhibition machines has appeared at the field, and under the expert guidance of Mr. Orville Wright on September 3rd, a few hours after leaving the factory, was in the air on its initial flight, climbing with plenty of reserve power and showing up a good speed. This machine is of the single propeller type, the first one of the products of the Wright factory to be so equipped, and the comparison of its performances with that of the two propeller machine, is even more interesting and instructive than the technical staff of the Wright Company had anticipated. Many exceedingly important features have been brought out, and Mr. Wright is spending a good deal of time flying this machine in various kinds of weather.

Its chief features are the ease of knocking-down and packing in boxes for cheap shipment from place to place, and also that the size of the sections themselves are such that if complete knocking-down into boxes is not done, the sections of the machine can be placed in an express car. This so greatly facilitates the getting around from place to place in making exhibition dates, that those familiar with this field, who in recent visits to the factory have inspected type "E" are most enthusiastic, and foresee in it exactly the type of machine that they require in their work.

The tests that are being made now will continue for some time, so that this type will be standardized and ready for the road long before next spring.

Many exhibition flyers and managers are expected at Dayton to view the performances of this machine later in the fall, "when it has gone through the mill" of the thorough tests and experiments that it is being put to.

The work at the Wright School, at Simms Station, has been continued steadily and one of the recent graduates of the school, who demonstrated excellent ability in his lessons was Mr. A. B. Gaines, of New York City. Although Mr. Gaines got to the stage where he was flying alone in fine form, it was necessary for him to return to the city before taking his pilot's license. However, Gaines is to continue work on the aeroboat next spring.

At present there are training at the school under Oscar Brindley's expert guidance, Mr. Lindop E. Brown of Glasgow, Montana, and Mr. H. M. Rinehart of Dayton, Ohio.

CORK FOR HYDROAEROPLANE FLOATS

An English dealer in a special variety of granulated cork (Leoline Edwards, 81 St. Margaret's Road, Twickenham) claims that this is twice as buoyant as ordinary cork, the air cells being considerably larger. It is suggested that floats be filled with this, with the handicap of slight extra weight, but with the assurance that danger from punctures would be greatly diminished. This cork is resilient and could as well be used for jackets, padding for seats, and so forth.

AIR EQUIPMENT OF THE U. S. ARMY

Sixteen aeroplanes are in the Army aviation service at the present time and seven more are on order and ought to be delivered early in October.

In the Philippines are: 1 Wright B, 30 H. P., training machine; 1 Burgess hydroaeroplane with 60 H. P. Sturtevant; 2 Wright C, 50 H. P.; all of which can be turned into hydros with equipment at hand. There are 5 pilots.

In Hawaii: 1 Curtiss E, 75 H. P.; 1 Curtiss tractor, 80 H. P.; 1 pilot.

San Diego: 1 Wright B, 30 H. P.; 1 Wright C, 30 H. P.; 1 Burgess-Wright F, 40 Sturtevant; 2 Wright C, 50 H. P.; 1 Curtiss D-E, 60 H. P.; 1 Curtiss D, 75 H. P. There are 7 pilots and 8 under instruction.

San Antonio: 1 Wright D, 50 H. P. No pilot.

Texas City: 1 Wright C, 50 H. P.; 1 Burgess tractor, 70 Renault. Two pilots.

In all, there are but 19 officers on aviation duty, of which number all can fly.

The machines on order are: 1 Curtiss standard, 70 H. P. Curtiss motor; 3 Burgess tractors, 70 H. P. Renaults; 1 Wright with 90 H. P. Daimler; 1 Curtiss tractor with 160 H. P. Gnome; 1 Burgess tractor with a 100 H. P. Renault. The State Department has purchased 8 Renault 70's and the new machines added to the one on hand will make 4 of these most successful tractors with 4 engines in reserve; these are considered an intermediate type between the standard Wright and Curtiss machines and the new high-powered machines coming through.

At Fort Omaha there are 5 fill balloons and 1 captive and a complete hydrogen outfit using the electrolytic process.

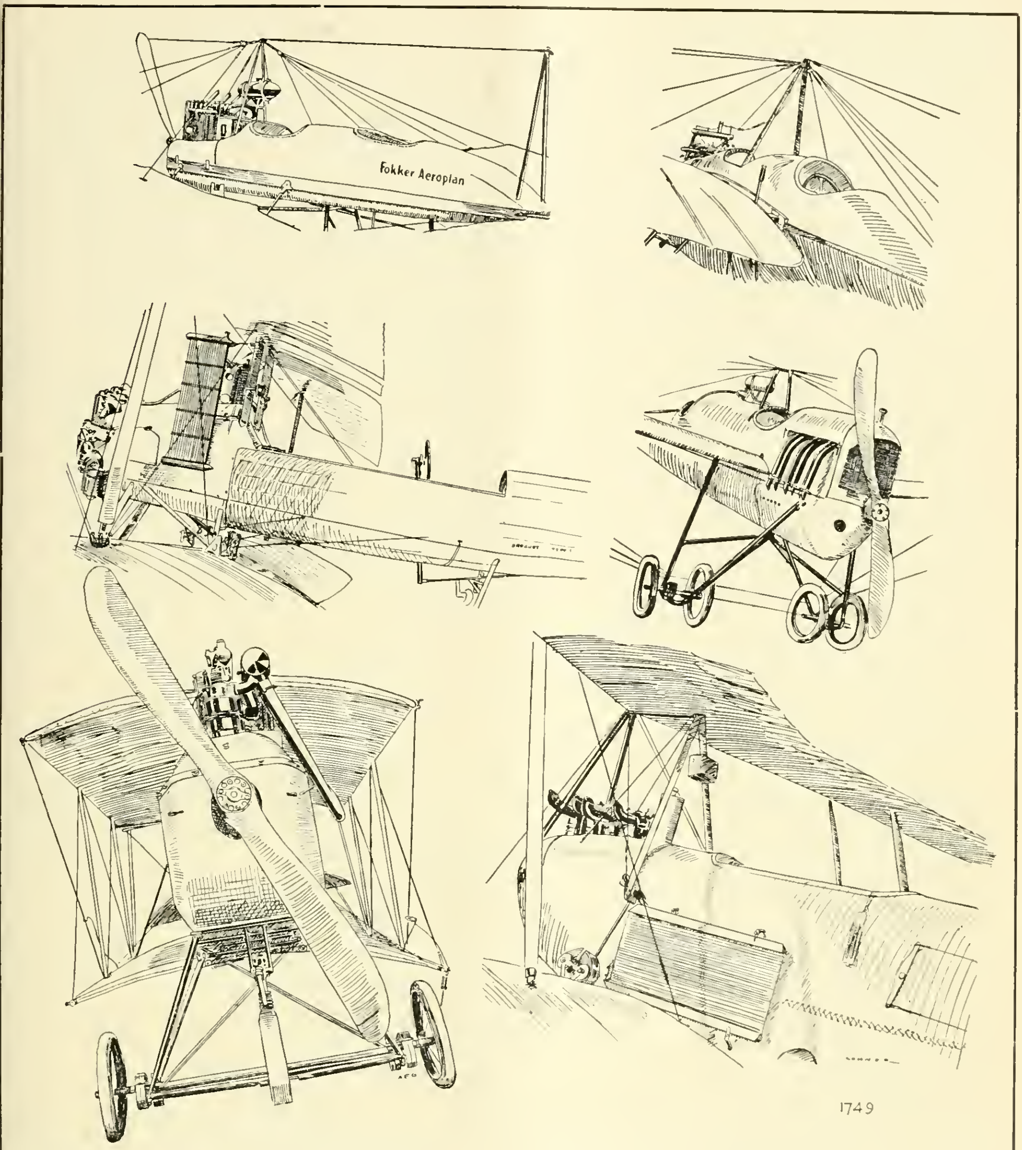
The old original Wright is now in Smithsonian Institute. Two Wrights, a Curtiss, a Curtiss flying boat and a Burgess (Wright type) have been destroyed in accidents.

U. S. AEROPLANE GUN

Very few details are available of the experiments that have been made by the Ordnance Department on high-angle guns, but it can at least be said that improvements have been made to existing types in the U. S. Army sufficient to make them adaptable.

Technical details: Weight of projectile, 6 pounds; muzzle velocity, 2400 feet per second; maximum limit of elevation 70 degrees; semi-automatic breech mechanism. Most promising projectile, high explosive shrapnel, the head of which detonates after a travel of about 75 yards beyond point of burst of the shrapnel The two puffs of smoke thereby secured serve to outline the trajectory near the point of burst and facilitate adjustment of range.

In the flight around Berlin on August 30th and 31st, 22 machines started and 16 finished. Of the successful aeroplanes, Bosch magnetos were used on 11 of them, which number also used Bosch plugs.



Some German Heads

I think the Panama Canal would be put out of business, probably in one hour or two hours, by an enemy with aeroplanes. That is, of course, my own personal opinion. We do not know the effect of an explosive dropped from an aeroplane, because it has never been done except in a small way. I firmly believe when the experiments are carried on in that direction that it will be found to be very destructive.

No matter how strongly the canal is fortified a (enemy's) fleet does not come within range of the guns; they cruise out 20 or 30 miles. The distance to Gatun Dam or to the locks would be probably half an hour's fly. They send out their aeroplanes loaded with high explosives, say 20 or 30 of them, as many as they can send, hoping that some of them will get back; but in warfare we take chances, and if they destroyed the canal no doubt they would be willing to lose them all. They send them up and they are flying one after another, placing 500 pounds of nitrogelatin first on the spillway and later up the Culebra Cut, causing slides. I think some of you gentlemen know the effect of an explosive, on the earth, causing it to slide.

Lieut. R. E. Scott.

THE ROYAL AIRCRAFT FACTORY BE 2

The biplane built by the Royal Aircraft Factory, England, the BE 2, early this year was the third of a series constructed and was designed after a series of experiments on full-sized machines to improve their efficiency and stability and the results obtained were in almost perfect accord with the computations of laboratory data. During these tests, improvements in speed, in range, in amount of load carried, in climbing ability, stability, ease of control and total efficiency, were obtained as the net results of applying laboratory data. The BE 2 was expressly calculated to exceed the requirements of the 1912 British aeroplane competition, from data furnished by the British National Aerodynamical Laboratory. The improvements were almost wonderful. The BE 2 has a range of from 42 M. P. H. to 72 M. P. H., can alight at speeds below 40 miles, climb at 480 feet a minute for first thousand feet, and go 6,000 feet at an average climbing speed of 380 feet a minute without passenger and has a gliding angle of 1 in 8 under best conditions.

The wings are set at a dihedral angle, each wing rising 1¼ degrees. Ends of the planes may be warped 7 degrees in either direction. As the usual flying angle is 2 degrees to 3 degrees, the down side of the plane has a maximum angle of 9 or 10 degrees, while the up side has a negative angle of 4 to 5 degrees. Though the efficiency is superior at 4 or 5 degrees angle, the large surface is used to get range of speed and rapid climbing. The tail plane has an area of 52 sq. ft. and carries flying about 35 pounds. The machine can be turned in a radius of 120 feet if properly banked. The area of the rudder is 12 sq. ft., and exercises a force of 115 pounds at 16 feet radius from c. of g. at 68 M. P. H. and at an angle of 20 degrees.

The elevators are hinged to the rear of the stabilizing plane and have a total surface of 25 sq. ft.

The landing gear consists of ash skids with a reinforced tubular axle with rubber shock absorbers. A rear skid is attached to the fuselage by a swivel joint and is turned with the rudder making steering on the ground possible at low speeds.

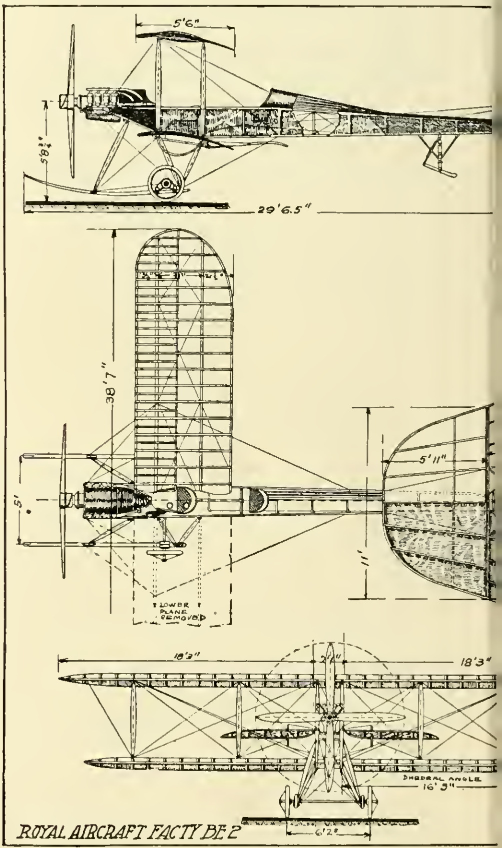
The 70 H. P. Renault engine can be throttled down so that the machine will stand still and the pilot can start without assistance. In actual flight the engine revolutions can be run from 1,350 to 1,950 and propeller revolutions from 675 to 975, still maintaining horizontal flight. The muffler which has been tried, seems to reduce the horsepower under load by 2%. The aeroplane has been inverted and laid on its back and the wings have been loaded to three times the loaded weight of the machine-weight of wings. This resulted in the strengthening of the rear lateral spar to give it the same proportional strength as the front one; however, the lighter spar did not take a permanent set.

The area of the upper wings totals 202 sq. ft., the lower, 172 sq. ft.

THE BREGUET TWIN-FLOAT SEAPLANE

While the hydroaeroplane meeting this spring, at Monaco, proved a succession of disasters, one unqualified success alone stood out. Moineau's magnificent flight in a gale will not readily be forgotten, and more than deserved the gold medal awarded it by the Ministry of Marine; and when Brégi carried off a non-stop flight of 160 miles, Louis Breguet fully established his reputation as the foremost French hydroaeroplane constructor of the day.

The two machines in question were of slightly different type, that of Moineau driven by a 200 H. P. 18-cyl. Canton-Unné being provided with one main central float furnished with oleo-pneumatic shock absorbers and one small auxiliary swivelling float midway along each wing, while Brégi's 130 H. P. machine had twin floats working on rubber shock absorbers. For the present we will confine ourselves to a description of this latter seaplane. To British *Aeronautics* we are indebted for a description of this machine. Its main dimensions are: Span, 50.8 feet; chord, 5.7 feet; length over all, 32 feet; plane area, 484 sq. ft.; length of floats, 13 feet; displacement of floats, 560 gallons; weight (empty), 1,980 lbs.;

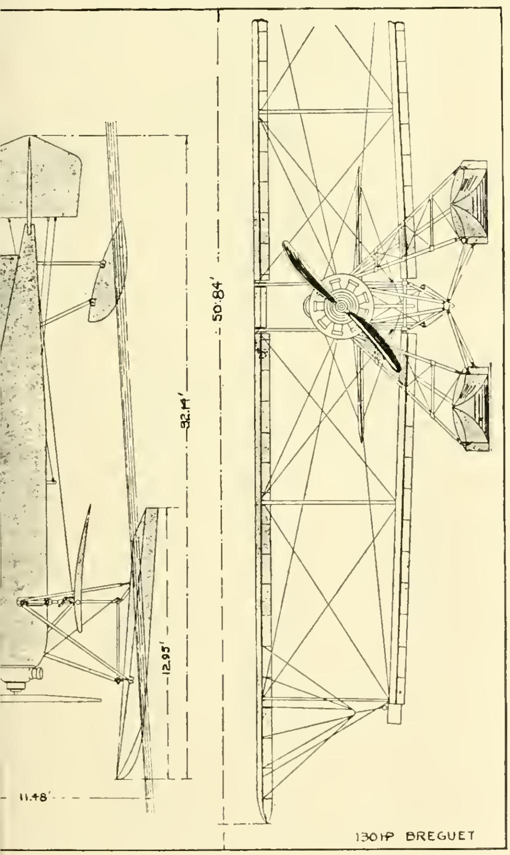


ROYAL AIRCRAFT FACT'Y BE 2

useful load, 750 lbs.; loading, 5.6 lbs. per sq. ft.; tankage, 4 hours.

The fuselage is not unlike that of the land machine, but with one important difference from the constructional point of view. It consists of four steel tubes converging towards the tail, and braced at intervals by steel struts and cross-pieces, by means of clips, none of the members being pierced. The lower surface of the fuselage is horizontal, the upper side curving downward towards the rear. The forward portion, of heavier gauge tubing, contains the seats and forms the motor bed. The seats are exceptionally roomy and give ample accommodation for two passengers, with a certain amount of space for luggage or spare parts. On the whole, this four-steel-tube fuselage is preferable to the old central-tube one, since it eliminates the danger from torsional stresses to which the other type was always exposed.

The wings are of the usual type, save that, in addition to the wires which prevent the incidence from falling below a certain angle and so obviate the danger of the wings flattening out in their rotary movement about the main steel spar, additional stops are provided, as a farther safeguard, which limit the movement of the steel spring connecting each rib to the spar. The upper plane has no dihedral, but the lower plane has a distinct dihedral angle, which has the further advantage of giving greater clearance to the wing tips.



The control is of the now usual Breguet type, and is universal: fore-and-aft movement of the lever operates the elevator, sideways motion actuates the warp, while steering is effected by twisting the wheel, motor car fashion. A foot warp control is added for the purpose of relieving the arms during long flights—a hydro by reason of its greater weight and the resistance of the floats requires more power to work the controls than a land machine—and of giving greater power of control in gusty weather. Incidentally, of course, it acts as a safeguard against the rupture of one control cable. The foot control is generally only employed to restore lateral balance in gusts and eddies, the hand warp being used for the more delicate maneuver of banking. All the control wires, with the exception of those of the warp, are carried within the fuselage—a most important point in a hydro.

The tail is of the ordinary Breguet type, save that the upper surface of the elevator is cambered so as to lift the weight of the tail float. The rear of the fuselage is equipped with a long triangular fin, to give weathercock stability and to balance the lateral float resistance, fixed to the fuselage by four steel arms.

The engine is a 9-cyl. 130 H. P. Canton Uné, fitted with two carburetors and running at 1,350 R. P. M. in the air. It is further provided with an excellent self-starter. An auxiliary magneto, giving an exceptionally long spark is fitted and operated from the pilot's seat by twirling a small switch-lever. When this is in operation a single swing of the starting lever starts the engine without effort. The propeller is a Chauvière tipped with copper. The pressure in the main tank is maintained by the familiar little air propeller working in the slip stream.

But the chief feature of the Breguet hydro, all said and done, is the marine portion—the floats and their attachment to the fuselage. The twin floats are of the Fabre type, with a perfectly flat under surface, and are constituted by two skins, the outer one being slightly flexible so as to yield slightly to the uneven surface of the water. Each float is 13 feet long, and divided into six water-tight compartments. The bow is fair-shaped and the upper surface slightly domed, so that, on the whole, the air resistance is not unduly high. The small tail-float rigidly attached to the rear of the fuselage is chiefly designed to protect the rudder since, normally, the machine rides the water on its two main floats. A small streamline float is attached to the extremity of each wing tip.

We now come to the suspension which, more than any other single feature, renders the Breguet hydro so distinctive and has undoubtedly played an important part in its success. Louis Breguet was the first to recognize the great importance of shock absorbers for marine work, in which they play an even more important part than on land machines.

(Continued on page 105)

BIPLANE "PONNIER-PAGNY" ON NEW PRINCIPLE

Half biplane, half monoplane is the structure built by two young French designers, after a study of two machines, a monoplane and a biplane, built by the same firm and with the same system of equilibrium. They found between these two types absolute dissimilarity instead of the similarity expected, considering they are two solutions of the same problem. In other industries similarity is the rule.

However, in the Ponnier-Pagny one finds this similarity, whether a question of monoplane or biplane, one or two passengers.

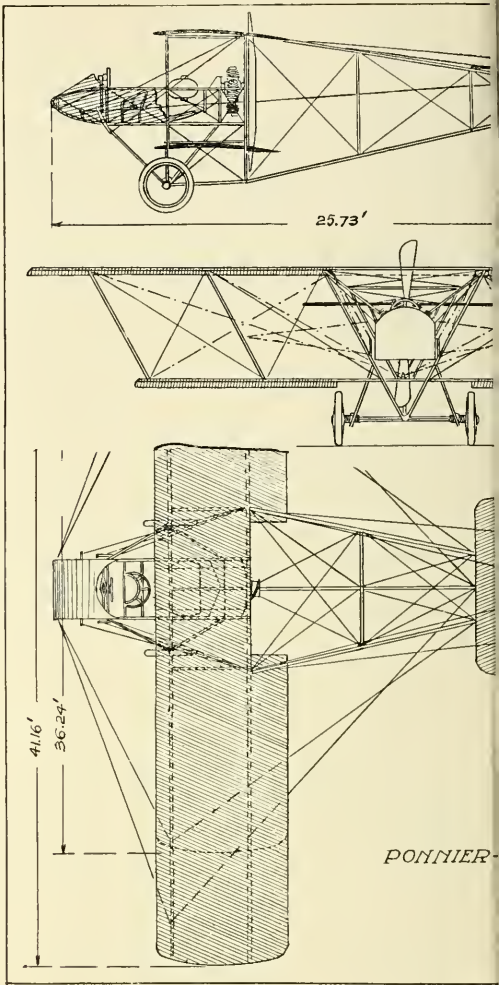
Excepting hydroaeroplanes, all the apparati of this firm belong to the category of machines whose centres of gravity, pressure, resistance and thrust about coincide. The c. of g. is, however, located slightly below the centre of pressure. The incidence of the horizontal tail, naturally non-supporting, is negative, and its value varies from minus ½ degree for single man machines to minus 1 degree for two man machines. This disposition gives to the longitudinal dihedral the greatest value and assures excellent longitudinal stability. Moreover, a "forward preponderance,"* and thus assures automatic gliding descent in the event of a sudden stoppage of the motor.

The screw is always a propeller and mounted direct connected to the motor, except for the special armored war machine. Its axis passes through the centre of pressure of the supporting surfaces (which are "sloped as desired"). If the machine is a single seater, the pilot, whose weight is an essential factor for proper balance, is placed forward of the entering edge; in the passenger machine, either the passenger sits over the c. of g. and the pilot in front, or else a passenger (observer or marksman) is placed in the extreme front before the pilot; or finally, the pilot and passenger sit side by side in line with the entering edge of the wings. In every case the field of vision is the greatest possible. Furthermore, the masses are near the c. of g. Therefore, the "nacelle," or car, is short and can be enclosed with sheet steel in streamline form.

The first machine of this series has commenced trials and the results were conclusive as to the principles involved, only a few slight details of construction had to be altered and the new machines confirmed expectations.

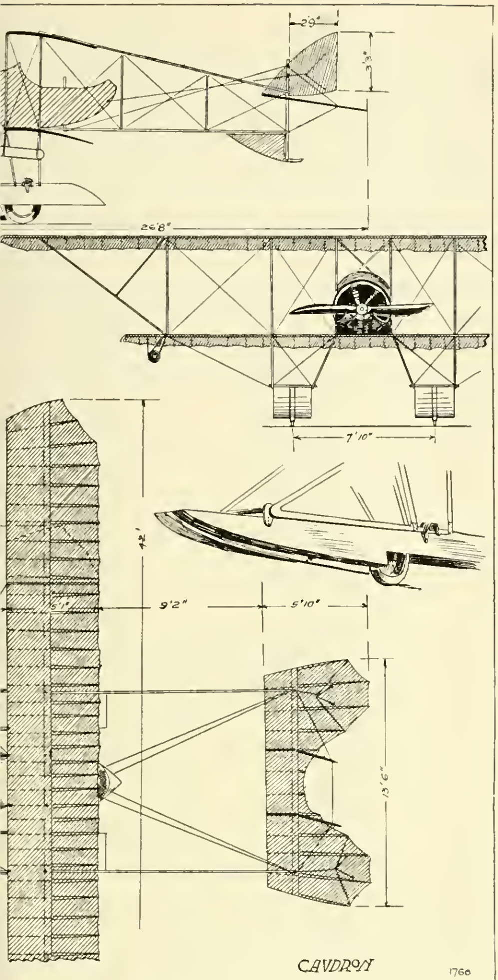
The "fuselage," or, more exactly, the car, is not in the first machine of steel. It is composed of a framework of steel tubing, covered with a fabric. The disposition of the organs is identical with that of the final apparatus. Special fittings, strong and light, are employed to connect them to the tubes of the fundamental prism.

The wings, designed with great care, comprise three parts: (1) An entering edge, very short, of angular shape acting as a wind deflector. (Modifications are under test for the



application of the Constantine system and actual tests are being made in flight by Ponnier himself. Note, in passing, recent article by Mr. Sellers in AERONAUTICS on the experiments of M. Constantin.) (2) A thick sustaining surface, comprised between the two spars, acting by depression on the back, and compression on the face. The profile of the back is parabolic and tangent to the leading and trailing edges; that of the face is parallel to it and joins with the leading and trailing edges. (3) The trailing edge is in the form of a blade, with parabolic profiles, and which operates by "recuperation." The centre of pressure is equidistant between the two spars which are jointed and not "journalled." Acting chiefly by depression, the wings have a very small incidence, variable according to the type of machine. Their profiles are similar. All the factors of their outline are in a mathematical relation advanced by Pagny, after numerous experiments made on wings of very different dimensions, of which the incidence varies from 4 degrees to 0 degree, and the

* By "forward preponderance" is meant that the c. of g. is forward of the c. of p. on wings.



cambre from 150 millimetres to 0 millimetre, passing through intermediate values. At the limit, for 0 degree and 0 millimetre, the face would be flat and the back parabolic.

The transverse dihedral is positive and is 25 millimetres per metre.

The warp is effected by pivoting the spars about their axes, and journalling the ribs on the spars; there is, therefore, no tension. The warp is progressive and powerful, and its extreme flexibility renders it quasi-automatic.

(Bielovucic affirms he did not operate the warp during his flight over the Alps).

Lateral stability is by warping, as above stated. Soon comparative trials will be made with ailerons and flaps. Longitudinal stability is assured by a foldable tail at the rear of the fuselage, same being at a negative angle of incidence, and an elevator in two parts, to permit the swinging of the rudder.

A vertical rudder is hinged to the rearmost strut of the fuselage. The tail truss is composed of beams of steel tubing and struts of the same material, braced with music wire.

The landing gear is composed of two lateral "V's," the branches of which are tied to the car, the tops of which are fastened by two pins rigidly to the prism. The axle is jointed, its displacement being limited by rubber bands.

A special device is used for the attachment of the motor, which can be varied, making it quickly demountable. Controls by a lever with double movement and by foot pedals. The folding of the machine is well worked out. The wings are demountable; also the tail—and their disarrangement is almost impossible.

CAUDRON NOT MERELY AMPHIBIOUS

Abroad they point to American flying boats as inland water craft unsuited for sea flying and supporting this contention they consistently stick to catamaran floats. The Caudron people, of whose machines we have seen a sample in this country use wheels as permanent fixtures, located in slots built in the pontoons, the wheels just projecting below the high step. Other foreign makers frequently use wheels which can be drawn up or let down. As will be seen from the drawings herewith, the "tread" is wide and the wheel axles are attached rigidly to the floats. Spring suspension is provided by rubber shock absorbers. The six chassis struts to each float are connected to two bars which are parallel to the sides of the float and far enough apart for the float to swing freely between them. This framing pivots about a cross-tube attached by clips to the float, which clips act as bearings for the transverse tube. At the rear, between the rearmost struts, there is another transverse tube also secured to the float. The ends of this tube extend far enough on either side to rest upon the parallel side spars mentioned first and the rubber bands bind the two flexibly together at their junction. It will be seen that the float pivots about the forward cross-member with a certain amount of vertical movement as admitted by the rubber bands.

The surfaces are the same as on the land machines. The rear portion of the main planes are flexible and the front and rear struts are quite close together. Lateral stability is secured by warping and the elevator is one single plane, which is also warped. The rudders are twin and are above the elevator. Control is by a universally mounted post for elevator and warp, with foot-yoke for the rudders.

The 80 H. P. Gnome is carried by overhung bearings and drives an 8 foot propeller. Two unique floats support the tail when the machine is at rest on the water and under the main planes are wing tip cylindrical floats. Some of these machines have been sold to the French Government and are now being introduced into England.

The area of the main planes is 350 sq. ft.; span of upper plane, 42 feet; lower 28 feet; tail plane (elevator), 50 sq. ft.; rudders, 16 sq. ft.; total length, 26 feet 8 inches; chord, 5 feet 1 inch; gap, 5 feet 1 inch. Full details, with scale drawing, of the Caudron monoplane were published in the October, 1912, issue.

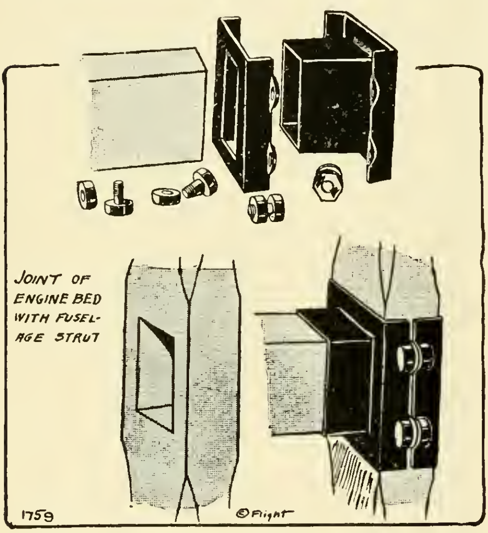
ANOTHER NEW SOPWITH WATER 'PLANE

The machine which Harry Hawker used in his great flight for the "Round Britain" *Daily Mail* prize was built by T. O. M. Sopwith, whose land machines were described in a previous issue.

This new water 'plane resembles the land machine generally but is fitted with a 100 H. P. 6-cylinder Green engine. It will be remembered by readers that a Green engine won the 24-hour test for the Alexander prize, of which test a full report was printed in AERONAUTICS.

The fuselage of this machine is of conventional construction, the longitudinals being of of ash and the struts and cross members in the head section of ash and in the rear of spruce. The main spars of the staggered planes are of spruce, I-section, the planes being set at a small dihedral angle. The engine section is covered in with aluminum.

Lateral stability is secured by ailerons of large size in both upper and lower surfaces, interconnected. These are operated by the rotation of the hand wheel which is mounted on a vertical column; a forward-and-back movement actuates the elevator and the rudder is turned by a foot lever. The control

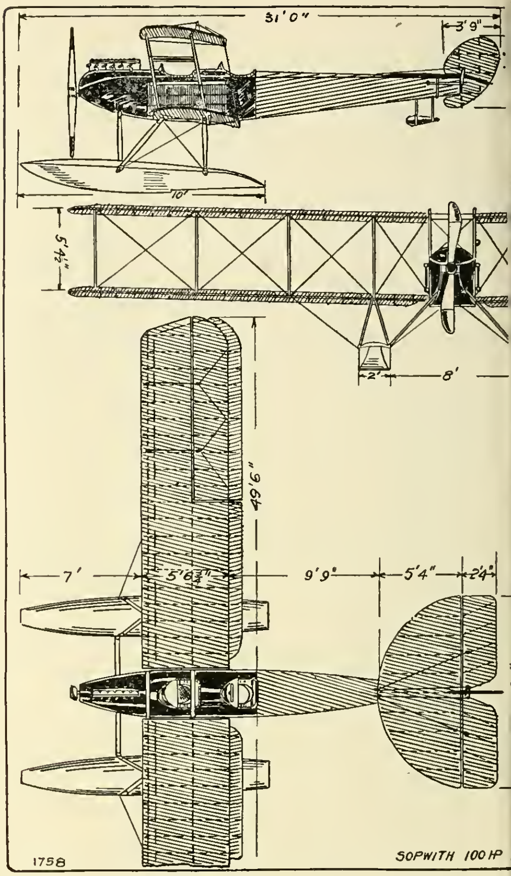


JOINT OF ENGINE BED WITH FUSELAGE STRUT

cables are inclosed in the body for the greater part of their lengths. The upper plane is open over the engine section. As shown in the drawings, "baffle plates" of streamline form partially make up for the lack of upper surface in this centre section.

With pilot and passenger up, fuel and oil, the weight is about 2,400 pounds and the flying speed around 60 M. P. H.

The single-step floats are framed in ash and spruce and covered with cedar. (A note on cedar lumber was published on page 136 of the April, 1913, issue). There are three com-



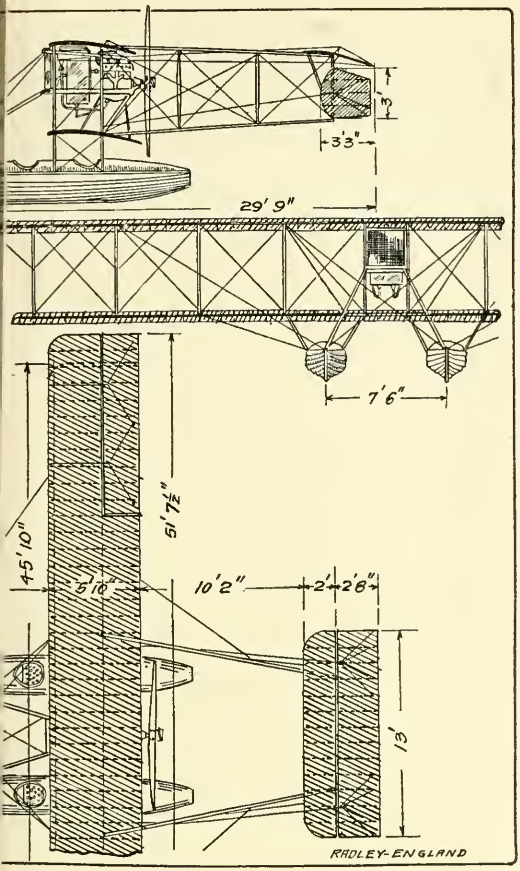
SOPWITH 100 HP

partments, two of which in each boat will keep the machine afloat. In addition to struts to the lower plane there are struts running up to the bow end of the fuselage to take the weight of the engine. The struts between the planes are hollowed out and all are of spruce.

Pressure is used on the gasoline tank and maintained by a small pump attached to a strut and driven by a small air propeller.

Total area main planes, 500 sq ft.; elevator area, 26 sq. ft.; tail plane area, 120 sq. ft.; rudder, 12 sq. ft.

The *Daily Mail* offered a prize of $25,000 to the first English aviator who, on a British-built machine, accomplished a circuit of the British Isles in 72 hours. Harry Hawker, after one previous trial in which he was obliged to give up, started with a passenger, on Aug. 25 from Southampton, followed the eastern coast up beyond Aberdeen, most to the north of Scotland, turned across Scotland at Cromarty diagonally southwest over the Caledonian Canal to Oban, on the western coast of the island. They left Oban the morning of the third day and crossed the Irish Sea and down the eastern coast of Ireland to a landing at Portrain, just a few miles north of Dublin. While making a spiral to land here, Hawker's



foot slipped from the rudder bar and lost control of the machine so that it dropped to the water. The mileage covered was 1,043 out of the total of 1,540. This incident was sufficient to preclude the possibility of repairing and finishing within the time limit. The first day 495 miles were covered in five stages, the longest single flight being one of 150 miles in 178 minutes.

Sopwith machines have made the following British records: Duration, 8 hours, 23 minutes; height, 11,450 feet; two-man height, 12,900 feet; three-man height, 10,600 feet, and world's four-man height record of 8,400 feet.

RADLEY'S HYDRO-AEROPLANE

James Radley, another English aviator whose flights have been numerous in America, and one of the members of the English team in the 1910 international race, with Gordon England, has produced a "waterplane" with features a bit out of the ordinary.

This machine is a modification of a machine built earlier this year with similar twin floats in which the pilot and passengers sit but which was powered with three Gnome engines, each driving by chain a propeller shaft, and each of the three being capable of being eliminated as a driving element. These floats were more or less of the conventional, simple type.

In this latest machine the floats are real boats, constructed by a boat-builder and are "clinker" built, known to all users of row boats, in which the planks overlap instead of butt together. Cedar is used and there are three watertight compartments; water is possible of entrance only in the central section of each boat. Two people may sit in each, tandem. The controls are of the type made famous by Farman.

A single engine is used this time, an 8-cylinder Sunbeam of 150 H. P., which drives through a two-to-one gear, a 4-bladed propeller, 9.5 ft. diameter and 4 ft. 7 ins. pitch. The engine runs normally at 2,200 and is a development of the automobile engine of the same name which has recently attracted great attention in track racing through its many wins at high speeds.

The location of the tank will be seen from the drawing, and this holds upwards of 80 gallons of gasoline and 8 gallons of oil.

Hickory spars are used for the main planes, of I-section, with poplar and spruce ribs. Struts are spruce, with exception of those in the engine section which are of Honduras mahogany. It may be interesting to note that the struts are hollowed out.

Lateral stability is maintained by ailerons in the top surface only, positive acting; one goes up as the other goes down and vice versa.

The elevator is of conventional type hinged to a non-lifting tail. The rudders are twin. The fabric is linen, coated with British Emaillite, which can now be purchased in the States.

The weight of the entire machine, with four up and fuel for ten hours, is 2,500 lbs., and the speed is 60 miles an hour.

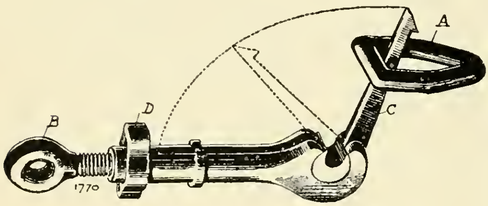
Total area main planes 560 sq. ft.; tail plane, 24 sq ft.; elevator, 35 sq. ft.; top plane, 290 sq. ft.; rudder, 18 sq. ft.

In criticizing the British Government for lack of support of the aeronautical industry and for lack of available aeroplanes in case of sudden necessity, the number being set at 38, Howard Flanders, a constructor, remarks quite as a matter of course: "Moreover, there are not more than about 48 British machines on order." Why, if we could count offhand 48 aeroplanes flying daily in America we would think we were flourishing.

Ninety-nine miles an hour for a Wright—This is reported in England when a Wright biplane is said to have exceeded, even, this speed fitted with an 80 H. P. water-cooled motor.

DEMOUNTABLE TURNBUCKLE

Everything for rapid take-down! We have now arrived at the quick detachable wire strainer, or turnbuckle; and it is patented in France and other countries. One wire fas-



tens at A and another at B. To close, the lever C is folded up in its slot, the while the loop A slips into place, the lock D slips over the hook of C and there you are. Tightening would be accomplished in the usual way.

AERO STRENGTH OF VARIOUS COUNTRIES

The strength of the air battalions of the various countries, tables of expenditures and appropriations have been compiled by the aeronautical section of the Signal Corps for use in the recent hearing before the Committee on Military Affairs. Doubtless this information is as near accurate as can be obtained, as it is useless to expect that foreign government are willing to furnish any data whatever. This compilation follows:

France: 14 dirigibles, 8 under construction; 611 aeroplanes, 238 officers permanently detailed, 620 military pilots, 1,174 officers and enlisted men on aviation duty.

Germany: 15 dirigibles, 5 dirigibles under construction, 420 aeroplanes, 300 military pilots.

Russia: 12 dirigibles, 10 dirigibles under construction, 200 aeroplanes, 80 military pilots.

England: 6 dirigibles, 2 dirigibles under construction, 168 aeroplanes, 135 military pilots, 74 officers and 682 men on permanent air duty.

Japan: 2 dirigibles, 1 dirigible under construction, 23 aeroplanes, 20 military aviators.

United States: no dirigibles, 17 aeroplanes, 19 military pilots, 19 officers detailed for aviation duty.

Italy: 8 dirigibles, 2 dirigibles under construction, 153 aeroplanes, 175 military pilots.

Mexico: 7 aeroplanes, 5 military pilots.

Austria: 7 dirigibles in use, 3 under construction, 136 aeroplanes, 91 pilots.

Brazil: 3 dirigibles, 18 aeroplanes, 12 pilots.

Belgium: 1 dirigible, 1 building, 40 aeroplanes, 68 pilots.

Spain: 1 dirigible, 48 aeroplanes, 20 pilots.

Bulgaria: 1 dirigible, 28 aeroplanes, 10 pilots.

Roumania: 24 aeroplanes, 15 pilots.

Chile: 1 dirigible, 6 aeroplanes, 3 pilots.

China: 25 aeroplanes, 12 pilots.

Greece: 52 aeroplanes, 10 pilots.

Switzerland: 4 aeroplanes, 27 pilots.

Turkey: 2 dirigibles, 15 aeroplanes.

Servia: 8 aeroplanes.

Argentine: 5 aeroplanes, 15 pilots.

Australia: 4 aeroplanes.

Norway: 3 aeroplanes, 5 pilots.

Montenegro: 3 aeroplanes, 5 pilots.

Denmark: 6 aeroplanes, 8 pilots.

Holland and Sweden: 3 aeroplanes, 10 pilots.

APPROPRIATIONS FOR 1913, VARIOUS COUNTRIES.

France*	$7,400,000
Germany†	5,000,000
Russia	5,000,000
England	3,000,000
Japan	†1,000,000
Italy	2,100,000
Mexico	400,000
United States	125,000

* $2,400,000 in for the Navy.

† Approximate.

‡ $12,500,000 and $25,000,000 will be expended in the Navy and Army respectively covering a period of 5 years.

By the end of 1916 the Chinese army expects to have 1000 aeroplanes, this year's budget calling for the purchase of 250.

The Chairman. And how long do officers generally stay in the (aviation) service?

Lieut. * * * That depends upon the temperament of the officer. Lieut. * * * has been in the service for some time; he started at the same time I did, and it has not affected him as far as I can see, but his length of service has made him more cautious; that is all. Some other officers find that it gets on their nerves, and they become practically worthless as aviators.

The Chairman. I suppose that after an officer loses his nerve he is worthless as an aviator?

Lieut. * * * Yes, sir; and he must quit, or he will kill himself; he will probably kill himself and somebody else with him.—Hearing before Committee on Military Affairs.

The model shown in the photograph is that of the Curtiss flying boat. It is ⅛th full size, is complete in every detail and is one of the finest examples of the model maker's art in America.

AERONAUTICS

Published Monthly by Aeronautics Press
122 E. 25TH ST., NEW YORK
CABLE: AERONAUTIC, NEW YORK
'PHONE, 9122 MADISON SQ.
ERNEST L. JONES, Pres't — — THOMAS C. WATKINS, Treas'r-Sec'y
ERNEST L. JONES, Editor — M. B. SELLERS, Technical Editor
HARRY SCHULTZ, Model Editor
SUBSCRIPTION RATES
UNITED STATES, $3 00 FOREIGN, $3.50

No. 73 SEPTEMBER, 1913 Vol. XIII, No. 3

Entered as second-class matter September 22, 1908, at the Postoffice, New York, under the Act of March 3, 1879.
¶ AERONAUTICS is issued on the 30th of each Month. All copy must be received by the 20th. Advertising pages close on the 25th.
¶ Make all checks or money orders free of exchange and payable to AERONAUTICS. Do not send currency. No foreign stamps accepted.

BREGUET WATER 'PLANE

(*Continued from page 99.*)

In the case of a central float airboat the matter is relatively simple, but with two floats the designer is immediately confronted by the difficulty of one float being constantly in danger of being struck by a wave, while the other descends into a trough, so that equilibrium may be easily upset; hence the necessity not only for enormous strength in the first place (and each of the Breguet floats weighs 180 lbs.), but for enormous shock absorbing capacity. Moreover, each float must be sprung so as to work wholly independently of the other.

This problem Breguet has solved in quite an original manner. To the front of each float, well in advance of the c. g., are attached two steel struts tied together by cross-struts, and mounted on ordinary universal joints. To the center of the after part of each float is attached a single steel strut by means of a ball-and-socket joint, whence it passes upwards through a hole in the lower plane, giving sufficient room for play, and joins the three front struts on a collar sliding vertically against heavy rubber shock absorbers of the type formerly used on the REP. Moreover a diagonal strut runs from the front and rear of each float to a central longitudinal steel tube connected to the fuselage by an inverted pyramid of steel struts. Every single joint constitutes a hinge, with the result that there is perfect flexibility and play in each direction. The system is ingenious to a degree; more, it is highly effective and once again reveals the originality of mind and the thorough going but unbiased manner in which this constructor approaches each new problem, a quality in which so many other designers, adaptors, and manufacturers are deficient.

This fine machine is not a land aeroplane to which floats have been attached; it is a seaplane in the true meaning of the word.

The amount of accessories to keep aeroplanes in the field is astonishing. During some British manoeuvers with two airships and fourteen aeroplanes, it took 8 motor cars, 12 light tenders, 10 heavy tenders, and 8 steam trucks to keep them going.

Aero Mart

U. S. ARMY REQUIREMENTS FOR WATER 'PLANES

1. Pontoon type of machine with inclosed body in which aviators are seated and instruments specified installed.

2. In case of single pontoon it shall have at least one longitudinal center line water-tight bulkhead and at least two transverse water-tight bulkheads giving not less than six water-tight compartments. In case two pontoons are used, each pontoon shall have at least two transverse water-tight bulkheads or not less than three water-tight compartments. Pontoons shall have at least three inches free-board when machine is fully loaded, this test made after machine has been floating on water 24 hours.

3. In flying boat type of machine aviators to be seated in boat and instruments specified installed. One longitudinal center line water-tight bulkhead and at least two transverse water-tight bulkheads; that is, not less than six water-tight compartments. Sufficient freeboard not to ship water going 30 miles an hour in the open sea in a 25 mile wind.

4. Plane of either type capable of easy handling on water, to have a tactical diameter of not more than 100 yards.

5. Protective armor for pilot, observer, and engine, subject to Ordnance Department penetration tests for a small-arm fire. Armor shall be made of chrome steel and be about 0.075 inch thick.

6. The following instruments and radio equipment shall be placed on each machine and shall be considered a part thereof: Tachometer, compass, aneroid barometer, barograph, map holder, stretching board, combined, clock, angle or incidence indicator.

7. All above instruments of make and type approved and furnished by Signal Corps, United States Army.

8. A radio telegraphic apparatus on each machine. Equipment furnished by the Signal Corps.

9. Power plant may be designated by Chief Signal Officer. Six hours' test on the block to determine its horsepower, speed, gasoline and engine consumption.

10. Upon delivery for tests the manufacturer will furnish the following data concerning the aeroplane: (a) weight, (b) normal angle of incidence in horizontal flight, (c) gliding angle, (d) gasoline and oil consumption of engine, (e) Safe increase angle of incidence, (f) two blueprints of engine and aeroplane, (g) list furnished with data.

TESTS TO BE PASSED

1. Carry two people with seats to permit largest field of observation for both.

2. Control capable of use by either.

3. Floats strong enough to allow beaching and rough water.

4. Pack for assembling by 6 men in 1½ hours.

5. Ascend at least 1,500 feet in 10 minutes, with live load of 400 pounds, and fuel and oil for 4 hours. This load to be carried in all prescribed flying tests.

6. Starting device.

7. Non-stop 4-hour flight.

8. Minimum speed 38 M. P. H., and maximum not less than 55 M. P. H.

9. Machine capable of safe gliding.

10. Manufacturers shall furnish demonstrators for all tests.

11. Manufacturers must provide name plate, giving necessary data, such as maker's type and serial number.

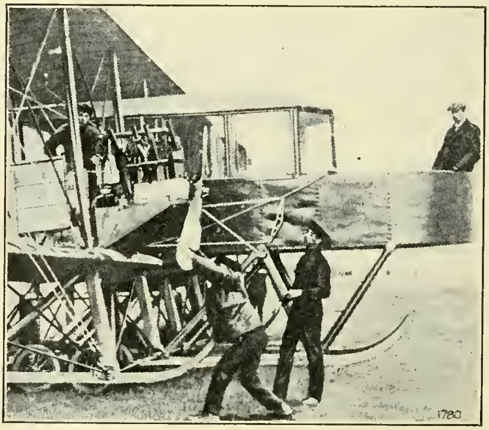
12. System of control of pattern approved by Board of Officers conducting tests.

13. Desirable features: silencer, flight in 20 mile wind, efficient stabilizing device, starting machine from within exposed body or boat.

THE SIKORSKY AIR LIMOUSINE

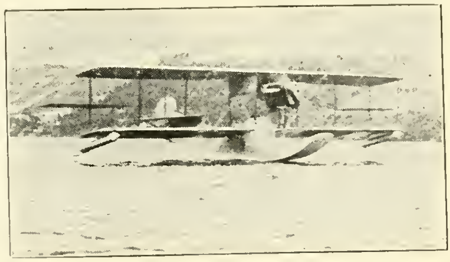
Probably the biggest aeroplane yet built is the new machine just now attracting attention, built by one Igor Sikorsky, a student with the Technical Institute at Kieff, Russia. It has flown a number of times and now holds the world's record for duration with seven on board, 1 hour 4 minutes. The passengers can walk around during flight and make sudden movements without affecting the stability of the aeroplane.

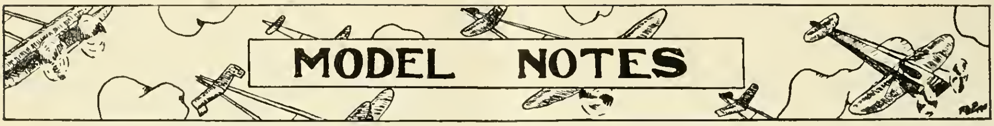
The aeroplane is generally of standard type, but heavy and with a cabin added. Four Argus motors of 100 H. P. each, driving 4 propellers, are placed in pairs, two in front, two at the rear, a pair on either side of the cabin, mounted on the lower plane. In later trials



the rear motors were moved to the front alongside of the other two, and the speed increased to 66 miles an hour. The supporting surface is 120 sq. m., spread 28 metres, total length 20 metres. There are eight wheels to the chassis, with elastic suspension. Ailerons for lateral equilibrium. The weight of the machine is 2700 kilos. (5940 lbs.). The machine gets off in about 600 feet and lands as easily as any other. The speed is over 45 miles an hour. It can carry 1600 lbs. load. The fuselage, of wood, terminates in a balcony for an observer. Back of this is a cabin 10 feet long, with two pilot wheels. Still to the rear is another cabin for passengers, provisions, bombs, etc. Even a couch is provided.

One motor may be out of service or under repairs during flight. The whole machine can be quickly taken down for transport.





THE FREELAN BIPLANE

By Harry Schultz, Model Editor

The model biplane shown in the accompanying drawing was constructed by Clifford Freelan, of Cypress Hills, L. I., and was the winner of a contest recently held by the Long Island Model Aero Club, the results of which appear below:

The fuselage consists of a single stick of balsa ½ inch square, tapering to ½ inch by ¼ inch at the front. The rear brace of bamboo is 9 inches long, ⅜ inch at the center, tapering to ¼ inch at the ends.

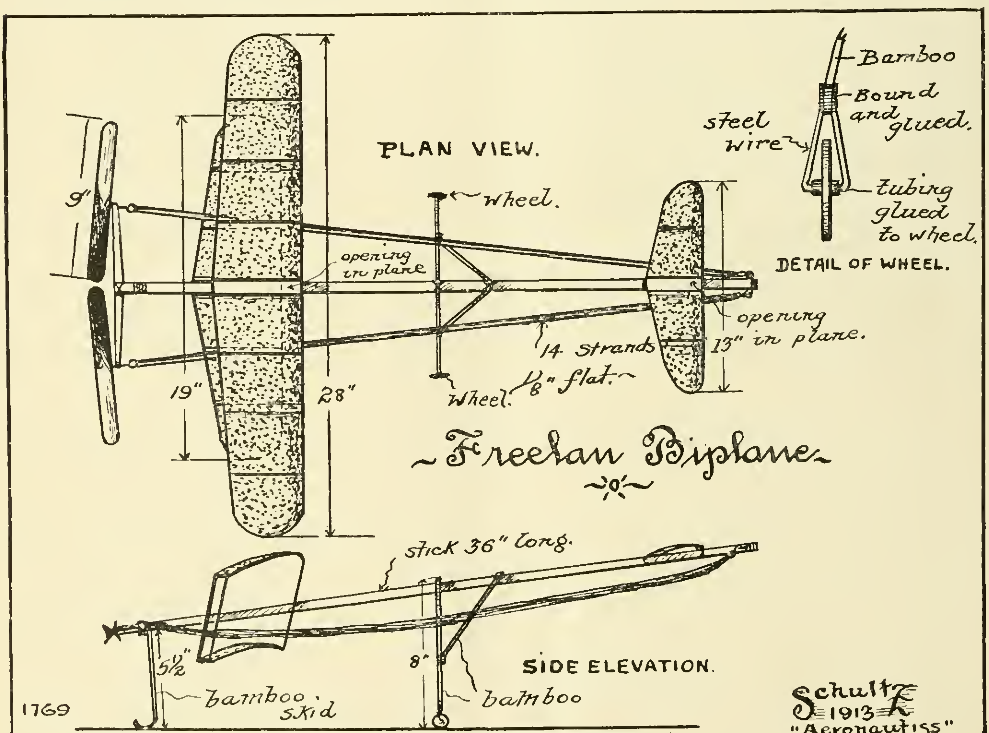
The propellers are carved out of spruce, are 9 inches in diameter and have a pitch angle of 45 degrees. The propellers are fitted with the usual bearings of 1/16 inch tubing.

The planes are constructed entirely of bamboo. The upper main plane has a spread of 28 inches, with a chord of 5 inches at the center, tapering to 4 inches at the tips. The lower main plane has a spread of 19 inches with a chord of 5 inches tapering to 4 inches at the tips. The struts or stanchions between the planes are eight in number and measure 5 inches in length. As shown in the drawing the main stick or fuselage passes between the main planes. As shown, the planes are slightly staggered. The elevating plane is constructed the same as the main plane, and measures 13 inches in spread with a chord of 3½ inches at the center. It is placed on an elevation block ¼ inch high about 3 inches from the front of the main stick. The planes are covered on the under side with silk paper and coated with ambroid varnish.

The chassis is constructed of bamboo, the rear skid being bent from a single strip of bamboo ⅛ inch square and 7 inches in length. The front skids are 8 inches in length and are braced as shown. The spread between the wheels is 10 inches. The wheels are ¾ inch in diameter and are constructed of two layers of 1/32 inch spruce laminated together. They are fitted with small pieces of tubing for hubs.

The model is driven by two motors of 14 strands, each of ⅛ inch flat rubber.

The accompanying photograph shows an exhibition model built by W. L. Butler, of Daly City, Cal. Mr. Butler is one of the foremost model flyers of the Pacific Coast, and as stated in last month's issue, is at present the holder of the world's record for models flying from the hand with a duration of 170 seconds.



News In General

WRIGHT-CURTISS LITIGATION

The last stage of the suit against the Herring-Curtiss Co. and Glenn H. Curtiss, brought by The Wright Company for alleged infringement of U. S. Patent Number 821,393, will be fought out by the attorneys for both sides in the United States Circuit Court of Appeals, Post Office Building, New York, some time in November, it is expected, the case having been appealed by Curtiss to this, the last court.

In the event of a decision in favor of the plaintiff, the amount of damages to be awarded will have to be figured out by a Master, who will be appointed by the Court. Arguments may be made before him by representatives of either side tending to arrive at a proper amount. Having made up his mind as to the damages accruing, the Master would take steps to collect, by attachment if necessary. The Court may award no damages, on the other hand. If the decision is that there has been no infringement, the suit will be dismissed and the use of ailerons for maintaining balance will be free.

There is no case in the courts against the present Curtiss Aeroplane Co. or the Curtiss Exhibition Co. The Herring-Curtiss Co. was formed in 1908, but a disagreement between the principals led to internal legal dissensions and the company went through bankruptcy. Mr. Curtiss bought the plant at the receiver's sale and sold it to the newly formed Curtiss Aeroplane Co.

The ailerons in the earliest Curtiss machines had a slight curve and these are the ones on which the present suit is brought. Later Curtiss adopted perfectly flat ailerons and introduced a device intended to equalize the aileron resistance, if any should occur, irrespective of whether they present equal, positive and negative, angles to the line of flight. Neither the flat ailerons, or any using the equalizing device, seem to come within the machine proved in the present case. It would appear that in case the plaintiff wins in this last court, the defendant company is bankrupt, and the suit is for infringement by the company and Curtiss jointly. And, also, the status of the ailerons as used at present on Curtiss machines with the operation of the special equalizing device appears to be still unsettled.

HISTORY OF THIS FAMOUS CASE.

In January, 1910, an order for preliminary injunction was granted, restraining Curtiss, etc., from manufacturing, selling and exhibiting, allowing, however, the concern to proceed under a $10,000 bond. An appeal of the injunction proceedings was taken to the same court as will hear the present appeal, which court reversed the decree. The injunction was dismissed, costs imposed on the plaintiff and the bond cancelled. In November, 1912, after many months of taking testimony, the case was argued, briefs were submitted, and in February, 1913, Judge Hazel handed down the first opinion on the merits of the patent in favor of the Wrights. Appeal was at once taken. Since this decision, the Curtiss interests have operated under a $10,000 bond again.

The above statement of the status of the suit is the view of the attorneys for the defendant. On the other hand, the plaintiff considers that the suit was not based on curved ailerons. The proving of their use was simply for the purpose of demonstrating that it really was not intended to carry pressure on the top as well as the bottom sides. Of course, it will depend entirely on the decision of the Court as to what will be covered.

RUSSIA WANTS MOTORS

Engineer N. Kouznetzoff, Aeronautical Department, Ingeniernaya 13, St. Petersburg, Russia, wants to hear from American motor manufacturers with catalogues.

INTERFERENCE IN PATENT OFFICE OVER DEVICE CLAIMED NOT TO INFRINGE WRIGHT PATENT

Incredible as it may seem, patent examiners, magazine editors, constructors and patent attorneys have never till now discovered the patent issued to Leicester B. Holland for a device which seems identical with that used in the Boland aeroplane, which is alleged not to infringe the Wright patent and on which application for patent was made on March 18, 1910, just a few days prior to the application, on March 21, 1910, for the Holland patent, which actually issued on Sept. 19, 1911, No. 1,003,459.

The patent examiner in each case has apparently not been cognizant of the work of his colleague until very lately, when interference proceedings have been instituted. The Holland patent has long been issued and the inventor naturally supposed himself safe as to priority. Boland has priority of application and Holland has the issued patent. Boland has gone along building machines and prosecuting the claims on his unissued patent under the same belief, totally unaware of the existence of a patent already issued covering the identical feature—at least it seems so, for did they not conflict there would be no interference action.

There are eight claims to the Holland patent which cover, in short, a rigid vertical surface at each lateral extremity of an aeroplane means for swinging each of these vertical surfaces about a diagonal axis extending from one edge of one main plane to a point in vertical alinement with the opposite edge of the other main plane.

'COL. REBER TO INVESTIGATE ACCIDENTS

Colonel Samuel Reber has begun an exhaustive investigation concerning accidents in the military aviation service.

GYRO EXPLOITS ABROAD

R. S. Moore is making his aviator-demonstrator "hump himself" over there at the Hendon weekly meetings. The Gyro-motored Wright is made to carry four full grown people and race fast Deps in speed contests. The speed contests are handicap affairs and the figures imposed upon the various machines are intended to equalize them and make the results depend principally on the skill of the pilots and the ability of the mechanics to get the engines in best trim. Moore's aviator was able on one occasion to beat our American friend, Brock, who was mounted on a 75 H. P. Dep., a 70 Farman and even a 100 Dep., which started scratch.

BOOKS RECEIVED

GRUNDLAGEN DER PHYSIK DES FLUGES, von Dr. Raimund Nimfuhr, 8vo., paper, 106 pp., with 10 figures. Published by Druckerei und Verlags-Aktiengesellschaft vorm. R. v. Waldheim, Jos. Eberle & Co., Vienna VII/1, Austria, at M. 4. Chapters: Einleitung; Die Luftverdrängungs- (Luftstoss-) Theorie, Senkrechter Luftstoss, Der schiefe Luftstoss, Mängel der Luftverdrängungstheorie; Die Theorie der statodynamischen Auftriebserzeugung mit Berücksichtigung der Atmosphäre als Ganzes und der Kompressibilität der Luft, etc.; Zur Theorie der Drachenflieger.

REVIEW OF APPLIED MECHANICS, by L. Le Cornu, 8vo., paper, 15 pp. Published by Smithsonian Institution, Washington, D. C., free upon request. Contains note on aerodynamical laboratories.

HOLES IN THE AIR, by W. J. Humphreys, Ph.D., 8vo., paper, 13 pp., plates. Published by Smithsonian Institution, Washington, D. C., free upon request.

DEATH OF LIEUT. LOVE

A Board of Officers at the Signal Corps Aviation School, San Diego, Cal., have investigated the aeroplane accident which resulted in the death of 1st Lieut. Moss L. Love, 11th Cavalry, on Sept. 4, 1913.

This Board, of whom two were eye witnesses of the accident, reported as follows:

Lieut. Love left the field at 7.23 a. m., Sept. 4, in Wright machine No. 18. He climbed to approximately 2,000 feet and flew at that altitude until 8.01 a. m., when he started to volplane. After completing a right turn at an altitude of approximately 1,000 feet, he continued on a straight-away glide very little, if any steeper than the normal gliding angle of this machine. At an altitude of about 300 feet he was observed to put on power. He continued gliding at approximately the same angle as before for quite a perceptible interval of time. Then the angle of glide gradually became steeper and steeper, the machine becoming vertical. There is a difference of opinion as to whether the machine went beyond the vertical or not, but the majority of witnesses are of the opinion that it did, striking the ground on the top plane first. The position of the machine seemed to bear this out. Witnesses are uncertain as to whether power was kept on until he struck the ground. The machine was a total wreck, but an examination showed all wires intact. Up to the time of the final dive, Lieut. Love seemed to be flying well, with the machine under thorough control, and as far as anyone could tell there was no collapse of any part of the machine in the air. The machine was thoroughly examined before Lieut. Love went up and had already been flown several times that morning.

The Board is therefore of the opinion that the accident was due in no way to any defect in the aeroplane itself. The air at the time was slightly puffy, but not dangerously so. The machine at all times up to the final dive seemed to be under thorough control, therefore, the only reasons that can be given for the the accident are either that Lieut. Love became unconscious in the air or that the dive was caused by bad air.

MODEL CONTESTS

At the flying field of the Long Island Model Aero Club in Brooklyn, N. Y., on Labor Day, September 1, 1913, a contest was held for biplanes rising from the ground for duration.

The contest was won by Clifford Freelan of the Long Island Club, whose model is described herein. The total of his three best flights was 155 seconds; the average, therefore, being 51 2/3 seconds.

W. F. Bamberger of the Bay Ridge Model Aero Club was second with a total of 130 seconds and an average of 43 1/3 seconds. His machine was fitted with Dunne type planes and showed remarkable stability in spite of the strong wind prevailing.

Excellent flights were also made by Frank Braun and Chas. V. Obst of the Long Island Club. Obst's machine was an excellently constructed biplane of the headless type with a built-up fuselage. He, however, was handicapped on account of the weight of his model and the low pitch propellers with which it was provided.

The contest was attended by an enormous amount of spectators and was a great success.

A contest for tractor models was held by the Bay Ridge Model Aero Club at the flying grounds at Rugby, Brooklyn, N. Y. The contest was a very exciting one, the models showing remarkable stability.

W. F. Bamberger, president of the Bay Ridge Club, was the winner of the single propeller tractor contest with a flight of 782 feet. This constitutes a new world's record as it surpasses the former record of 519 feet held by F. G. Hindsley of England. F. Hodgeman, flying a double propellered tractor made excellent flights; his best being 633 feet.

The world's record has been broken for rising off ground models, for duration, by Mr. L. H. Slatter, of England, with a duration of 131 seconds. His model weighs 8½ ounces.

"Last year we had a few visitors to the field; this year a dozen people at the field on a Sunday we consider quite a crowd; still we keep right on flying and working.

"Why don't you try and get the Aero Club to run a meet, spend a few dollars, and give us a chance to make some money; we won't hold on to it but will put it in circulation as fast as we get it."—*A Hempstead Aviator.*

PEGOUD ACTUALLY DOES THE LOOP

On September 21, cables report that Pegoud, after a dive turned his aeroplane so that the wings formed a right angle with the earth, righted, turned the machine over again on the other wing, righting each time. Then he looped the loop, diving vertically, heading the nose up, gliding upside down with the wheels above around the loop and then diving again to normal position. While the machine makes complete somersault about its transverse axis, it seems clear to aviators here that Pegoud must have been falling all the time, which would make the altitude at the "top" of the loop actually less than at the beginning; in other words, that Pegoud did not actually make a circle in a vertical plane with the top John Iseman, Joy Atwater, E. C. Flick and C. E. O. Sim.

Pegoud is quoted as follows:

"If some fearful gust of wind should turn an aeroplane over, the pilot could regain a normal position by pivoting on one wing. I proved this three times by flying downwards with a machine on its side and righted each time, both on the right and left wing. The downward falls with the wings perpendicular to the earth, whether the engine is running or not, are no longer dangerous.

"I tried in the whole series of these falls by warping a wing to its fullest extent, without using the rudder. The way in which the machine righted itself, merely by a movement of the rudder in the reverse direction, was simply amazing.

"For my falls of 500 feet, tail downward, I pointed the nose of the aeroplane upward by pulling the steering pillar right back, and I let her rip. The way I tried to capsize the machine sidewise was by warping a wing to the fullest extent in the very act of banking steeply.

"If I want to capsize an air machine in the ordinary way I simply start coming down, stop the engine and push the steering pillar right forward until the machine has turned over on its back. I have always wanted to loop the loop, though I had not announced my intention of doing so until recently. When I was 2,500 feet up I began a precipitate descent by pushing forward the steering pillar, then I pulled it backward, the engine running freely until the machine was round the loop and ready for the vertical dive."

A Russian army aviator who duplicated Pegoud's first upside-down flights was court martialed and given 30 days in jail to reflect.

MILTON KORN DIES FROM FALL

Celina, O., Aug. 19—Milton Korn died as the result of injuries received in a fall during a flight as passenger with his brother in a biplane, on Aug. 13. The brother did not sustain fatal injuries. No details of the accident are available.

MAX LILLIE KILLED

Galesburg, Ill., Sept. 16—Maximilian Theodore Liljestrand, known as Max Lillie, for several years a most successful flyer of his Wright biplane, owner of a school of flight at Chicago, was killed in giving an exhibition. An examination by G. C. Loening, of the Wright Company, states that the machine used was constructed of spare parts of old machines and parts made by Lillie; that vital steel parts were rusted, the cloth was rotten, that joints were stiff, that inferior metal parts were occasionally used, though control wires were in good condition; that any number of joints and wires might have given way due to increased strains; wires and pins showed wear; the direct cause of Lillie's death is ascribed to the folding up of a right wing straightening out from a turn to the left and about to land.

INCORPORATIONS

Indianapolis (Ind.) Aerial Navigation Company of America, $100,000 capital stock. Capt. G. L. Bumbaugh is president and general manager. Associated with him are Harry B. Wilson, assistant cashier of the City National Bank as vice-president and treasurer, and Herbert A. Luckey, attorney, as secretary. The purpose of the company is to deal in dirigible balloons. About $25,000 of the capital stock has been subscribed.

Russell Aeroplane Co., of Cleveland, Tex., capital $12,000; incorporators: James M. Murray, E. T. Murray, J. D. McDowell, A. S. Deuel, Cleveland.

The Atwater Safety Flying Machine Company, Akron; flying machines; $25,000; M. L. Atwater, of the circle higher above the ground than the bottom.

BUSINESS TROUBLES

Paul Studensky, of Brooklyn, N. Y., a Russian, who has lived in the United States two years, has brought suit against the Silver Lake Aviation Company of New Berlin, O., for $10,000 damages. The aviation company is supposed to conduct a school of flying. Studensky says he signed a contract June 7, by which he was to be employed one year at $50 a week and 20 per cent. of gross exhibition receipts, are covered by a guarantee of $100 weekly. He says that after two weeks he was notified his salary had been stopped.

WORLD RECORD WATER FLIGHT

Sept. 23—Roland Garros flew from St. Raphael, France, across the Mediterranean to Bizerta, Tunis, non-stop, in 7 hours 53 minutes, a distance over water of about 560 miles. No floats on his land machine were used, nor were any boats stationed along the route.

Sept. 7—Alfred Friedrich and passenger flew from Berlin to Paris. He started on Sept. 3.

Sept. 13—A. L. Sequin flew non-stop from Paris to Berlin, about 590 miles.

Sept. 17—The Michelin cup for distance flying was awarded today to Aviator Fourny, who covered 9,993 miles between August 25 and September 16. Fourny flew daily and never once suffered serious mishap.

CHRISTOFFERSON'S NEW PLANE

Mr. Christofferson is now flying a small racing biplane of his own make, equipped with a Hall-Scott 60 H. P. motor. This is an ideal equipment for filling exhibition dates, and so far he has filled five or six within the last two weeks. The most noteworthy of these was his date at Salt Lake City, altitude 5,200 feet, where he flew without extensions for two days without any trouble whatsoever. The next date was at Provo, 75 miles distance, and he flew this one afternoon at better than 72 miles an hour. He states that the equipment was perfect in every way, and that it gave as much or more power than his 80 H. P. motor. Blakely writes from Canada that he has flown 500 miles, cross country, without a stop between flights, within the past 10 days. A 60 H. P. power plant has been sold to the Salvadorean Government.

INTERNATIONAL RACE

There are 10 contestants entered in the international race at Rheims, France, on September 29.

Chas. T. Weymann, the Europeanized American, is to be the representative of the States, and will probably use a Dep.

There will be a three days' meeting at Rheims, on September 27th, 28th and 29th. The first day will be given up to the French eliminating trials for the Gordon-Bennett race; the programme for the second day will be made up of various competitions, while the Gordon-Bennett race will take up the last day. For the race six countries have entered: France, Great Britain, United States, Belgium, Germany and Italy.

The race is over a 10 kil. course for 200 kilometres. Landings are permitted. The winner of the race will be that competitor who has completed the whole distance in the shortest time. The machines must be capable of flying as slow as 42 miles an hour, demonstrated beforehand.

BALLOON ASCENSIONS

Holmesburg, Pa., Sept. 18—A. T. Atherholt, Dr. Jerome Kingsbury and P. H. Bridgman in the "Penna." landed at Flagtown, N. J., after a night trip, encountering a heavy rain storm.

AVIATION SCHOOL IN LIMA

An aviation school has recently been founded in Lima under the auspices of the National Aero League (Liga Nacional Pro-Aviacion) under $27,000 subsidy by the Peruvian Government for acquiring aeroplanes and other equipment necessary for such a school. The instruction will probably be in charge of J. Ramon Montero, instructor in the Bleriot school, near Paris, who participated at the Chicago aviation week of 1912, and has since given exhibition flights in Lima. Inquiries regarding possible acquisitions of needed supplies can be addressed in English to Senor Montero.

U. S. Patents Gone to Issue

Copies of any of These Patents may be Secured by Sending Five Cents in Coin to the Commissioner of Patents, Washington, D. C.

Even in these enlightened days, the crop of patents on absolutely worthless, or even questionable, devices increases rather than decreases.

It would take an entire issue of the magazine to abstract in a full and clear manner the claims of the majority of the patents issued. In a great many cases it is even impossible to give in a few lines what sort of an apparatus the patent relates to. In most instances we have used merely the word "aeroplane" or "helicopter" if such it is. Where it is impossible to indicate the class, even, in which the patent belongs, without printing the whole patent, we have used the word "flying machine."

The patents starred (*) are those which may be found of particular interest; but it must be understood we do not pretend to pass judgment upon merits or demerits.

Where patent seems to have particular interest, the date of filing will be given.—*Editor.*

Do not attempt to invent in a field the science and prior art of which are unknown to you—William Macomber.

ISSUED AUGUST 26, 1913

1,071,180—Alfred Arnold Remington, Birmingham, England, AIRSHIP. Apparatus for condensing the water vapor in exhaust gases in order to keep total weight of an airship intact.

1,071,425—Rudolph Jary, Chicago, Ill., AEROPLANE, with two upper supporting planes tandem and removable additional planes between the former, and means of attachment.

1,071,505—Alexander Bryant, Chicago, Ill., AIRSHIP, with supporting planes and beating wings.

ISSUED SEPT. 2, 1913.

1,072,078—Joseph H. Beckwith, St. Louis, Mo., HELICOPTER with parachute above each lifting propeller.

ISSUED SEPT. 9th

*1,072,514—Johann Schutte, Danzig, Germany, DIRIGIBLE BALLOON detail. Attachment of cars to rigid airships so as to avoid injury to the car and connections with the frame as frequently happens with this class.

1,072,663—Anthony R. Silverston, Milwaukee, Wis., FLYING MACHINE, comprising tubular body with means for driving air through it; aeroplanes, etc.

1,072,664—Anthony R. Silverston, Milwaukee, Wis., FLYING MACHINE more or less similar.

1,072,710—Henry C. Fisk, Stafford, Conn., STABILIZER for aeroplanes consisting of a "dished" plane above the supporting planes, and means for attachment.

1,072,764—William A. Nagel, Harrison, Ohio, PARACHUTE ATTACHMENT with tube fitting around the 'chute, means to open parachute container for tube and 'chute, means for ejecting.

ISSUED SEPT. 16th

1,073,277—Henry G. Morris, Philadelphia, Pa., HELICOPTER.

1,073,334—George E. Dickson, New Lenox, Ill., FLYING MACHINE. Rigid reciprocating parachutes, with valves therein.

Subscriber's Forum

AUTOMATIC STABILITY

An article in the June number of AERONAUTICS, which also refers to other articles elsewhere, speaks of the proposed use of negative wing-tips or a reversed dihedral angle of the wings as a means of automatic stability. This should never be attempted.

In the first place, we may draw an inference from the fact that no birds fly in this way, except in hovering, an evidently difficult accomplishment, even for them.

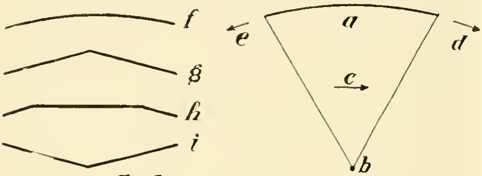


Fig 1

In the second place, I demonstrated by theory and experiment, as far back as 1897, that a curved body suspended in an air current follows the line of least resistance. The concave aeroplane "a" (Fig. 4) in still air or drifting with the air, and with sufficient steadying weight at "b" will make an excellent parachute; but if driven forcibly in the direction of the arrow "c," it will tend to buckle around, in the direction of the arrow "d," moving as though on the surface of a sphere of identical curvature. If this plane be slightly elevated at the front, and held rigidly with framework and a tail, it will, of course, be perfectly safe; but, when a question of lateral stability is concerned, and instability is the defect to be overcome, such lateral forms as shown at "f," "g" or "h" are very liable to sudden disaster and should never be employed. Any one of them is liable to "catch a crab" and "turn turtle" (or do any other undesired marine zoölogical stunts) at any instant.

The greatest source of lateral stability, in an aeroplane as in a bicycle, is headway; the greater the speed, the less apparent veering of the head-wind will there be, due to the lateral gusts. And this apparent veering can easily be annulled—as in bicycle riding—by heading up into the gust. This can be almost entirely accomplished by having a larger rudder, or a keel. A large, vertical vane or partition, or several of them a little back of the centers of gravity and support, and centered at about the height of the center of gravity, would be quickly affected by a gust; and the further back it was placed, the more tardy the action, but the smaller the necessary area.

Where the wings are set at a positive dihedral angle, as at "i," any sudden side-gust will bring the apparent headwind more or less under the windward wing. Here, again, the broken curved surface tends to slide as on the surface of a sphere; but it is a lower surface, the center being overhead. This will produce a lateral rocking or careening, but of a much safer kind, because the motion of translation is against gravitation, upward, instead of downward and with the gravitational acceleration, as in the former case. By the time that the gust gets to the rudder, and turns the head into the wind, the aeroplane will be ready to slide back again to safety, from its own weight. Of course, the rocking motion will be less in proportion as the dihedral angle is small and the center of gravity high. It will also be less in proportion as the lateral lever-arm is short. I would, therefore, also suggest shorter span for the wings with three planes, as tending to better lateral stability.

RUTER W. SPRINGER.

CONCERNING THE INVERTED V

An article in this issue by Mr. Springer condemns the transverse inverted V disposition of aeroplane wings. His arguments are answered in the articles to which I referred in my June "Talk."

The statements made there concerning this disposition are justified both by theory and experiment. As before stated, a lateral gust is equivalent to a veering head wind or to the momentary turning of the aeroplane's longitudinal axis at an angle to its course.

In Fig. 2 the inverted dihedral wing is shown turned in this way, the course being toward the observer; and it is evident that the angle of attack of the windward wing A will be diminished while that

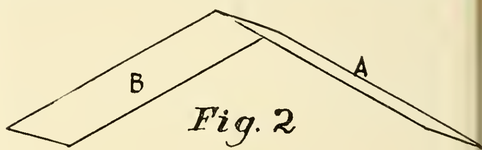


Fig. 2

of B will be increased; in fact, A may receive the air pressure on its upper side. The windward wing A is, therefore, depressed while the wing B is raised. This is confirmed by experiment, and experiment further shows that a machine of this kind having a low c. g., and coming into this position, turns toward the low side.

M. B. SELLERS.

The contention that a lateral gust is equivalent to a veering head wind, and that the windward wing will be depressed while the leeward wing will be raised, if an inverted dihedral angle is employed,—is perfectly correct, so far as it goes. In fact, as the wings cant, under the influences stated, these influences will continue to act with more and more power, and the canting will become more and more pronounced, until the aeroplane upsets. The effect would be exactly analogous to that of feathering an oar the wrong way in rowing; the near wing would receive the air pressure upon its upper side,—which would be far worse than any "hole in the air," and there would be an instantaneous and fatal exemplification of the law that the V-shaped dihedral is the form of stability, by the aeroplane assuming that position. However, "crabs" are not aerial animals; and I hope no one will experiment in "catching crabs" in this manner. Of course, a low center of gravity would do much to impart steadiness; but a high c. g. has many points of superior excellence; and we are talking of aerial stability, not possibilities of instability.

RUTER W. SPRINGER.

To the Editor:

What is the simplest way to calculate a power plant for an aeroplane for given loan of 2000 lbs., planes placed 1.6, diameter and pitch of propeller at motor speed of 1200 R. P. M., speed 60 miles an hour.

J. H. B., Tex.

Answer.—For 60 miles an hour you can count 20 lbs. per H. P. for an average machine (amount carried ranges from 16 to 25 lbs.); diam. of propeller depends on make—for 100 H. P. about 9 ft. by 5.5 ft. pitch.

To the Editor:

Please tell me how to balance a Dumont 'plane which is too heavy in front and not heavy enough behind. The tail will tip up at half speed rudder level.

C. R., Ill.

Answer.—Move weights back a little or give tail more negative angle; or both.

HARPER'S AIRCRAFT BOOK, by A. Hyatt Verrill. 8vo., cloth, 242 pp., profusely illustrated. Published by Harper & Brothers, New York, at $1.00 net. Written particularly for boys and young men at school, Mr. Hyatt, through his intimate knowledge has made the book an intimate introduction to the men and boys who have done things in the big as well as little planes. Members of the model aero clubs will find the book invaluable. Mr. Verrill is an authority on motors and is known personally to many of his fellow members of The Aeronautical Society, before which organization he has frequently lectured.

To the Readers of this Magazine,

GREETING:

I beg to steal a page from the many of "good stuff" to air my troubles.

This is no Swan Song. That's settled right now. Periodicals are generally published for two reasons: usually to make money, sometimes as a philanthropy.

This magazine falls in neither class. It is published for the benefit of those who find profit in it. The editor is not a philanthropist (though he would be were it possible). The editor is not a business man, or he would not be publishing an aeronautical journal.

That some profit by its publication I know, for they pay their subscriptions. That others profit by its publication I know, for they say so. Now there are still some who speak not; neither do they pay.

These do I address. There are but three propositions. Pay, promise to pay, or say frankly you don't want the magazine.

I am doing my best to furnish the best there is. If you find a better magazine, subscribe to it; and then tell me you've found it. That will help me, perhaps. If you object to certain features, tell me.

I can't speak to you all with sounding words. I must ask you to read what I write. If you don't want the magazine, say so. If you have found a better, tell me! If you do want it, may I have your renewal order or your check?

Thank you in advance.

E. L. Jones

AERONAUTICS

XIII. No. 4 OCTOBER, 1913 25 Cents


The Flight Around Manhattan Was
Another Bosch Victory
-- Of Course
1st Luckey—Curtiss—Bosch
2nd Niles—Curtiss—Bosch
3rd Wood—Moisant—Bosch
and
Sablatnig's Remarkable Altitude Record of 3,281 feet with five Passengers is a Bosch Record, too. : :
BE SURE YOU GET
"Locating the Spark Plug"
It tells you what you ought to know
Bosch Magneto Company
201 W. 46th STREET :: NEW YORK

A YACHTMAN'S VIEW OF THE AIR BOAT

By Chas. D. Lynch

Chairman Sports Committee Perry Centennial Celebration

Certainly nothing can beat leaving the water and alighting on it with a flying-boat when it comes to sport. Planing through the water at 50 miles an hour sends a wonderful thrill through you. Starting out of the water gives you a sensation more thrilling. Alighting on the water and skipping along over a few waves, then settling a little and planing along, caps the climax and you are a flying-boat-fan right!

For yachting men who like to handle the stick when "she has a bone in her teeth" the writer recommends a trip in a flying boat as they will be most likely to fully appreciate the pleasures to be experienced. Sailing high in the air for a long time at 65 miles per hour was intensely interesting and a great experience. Viewing the map below, noting the bays and inlets, the islands, the farms, the boats, the docks, etc., has studying geography backed off the boards. No map ever conveyed ideas such as an air trip will give.

As we circled and soared upward, constantly driven on our course as a first-class motor yacht would be, the writer was greatly impressed with the fiying-boat's possibilities for sport and for use in scouting or dispatch-carrying. Sitting in a comfortable position, in a boat wth plenty of "freeboard," enjoying a sense of safety instilled by the substantial construction of the boat and the wonderful operating devices over which the pilot had perfect control, it was a great treat to go around an aerial race-course encircling the bay where Perry had put in after his victory in 1813, then to seemingly "bank" at the turns as it would seem natural we should, then turn and incline downward, not with a drop or slide, but with a steady drive on a down grade, then easily incline upward and drive on an upgrade—all this seemed wonderful to the observant and grateful passenger who was being initiated into the new sport he had been hearing about but never indulged in before.

My flight was made during a four week's regatta at Put-in-Bay, Ohio, a part of the big Perry Centennial Celebration, celebrating the One Hundredth Anniversary of Perry's Victory in the Battle of Lake Erie, and a century of peace between Canada and the United States, was held this August under the auspices of the Inter-Lake Yachting Association, from the 19th to the 26th.

There were regattas for sail yachts, power boats, naval militia cutters and whaleboats, canoes, rowing shells, swimmers, and probably for the first time, "aeroyachts." The sport of flying in and over the water was classed with other aquatic sports.

All the advance fine weather dope was upset. The week proved the worst in August and the worst in August for years. A northeast gale of magnificent proportions, even the kind that would have worried the sail yachts or power boats, proved the only "worry" the committee had on Tuesday morning of August 19th, the date for things to begin.

The day before the ever-surprising Tony Jannus hove in sight over South Bass Island of which Put-in-Bay is the anchorage, coming straight from Sandusky, over Lake Erie, in his Benoist flying-boat which was destined to be the real "thriller" of the meet. A few minutes after "Tony" landed the crowd sighted another craft in the distant atmosphere. Beckwith Havens, in his big Curtiss flying-boat of Chicago to Buffalo fame, came down from the higher altitudes and made a beautiful landing. Havens had come from Toledo, right over Lake Erie for forty miles, with his friend Chenevert, of Detroit, as passenger. They had enjoyed a delightful forty mile cruise in thirty-six minutes—just an afternoon sail.

On Sunday the 17th, Walter Johnson, with his Thomas flying boat with his new Austro-Daimler motor; Frank Burnside and Fred Eells, of Thomas Brothers, with a pontoon-type hydroaeroplane, and William Bleakley with his Benoist pontoon-type hydro had arrived at Put-in-Bay and started to assemble their "yachts" at convenient "mooring" points assigned by the committee.

The assembled pilots and aviation representatives, together with the yachtsmen on the committee, all in great enthusiasm over the plans the committee had laid down, turned in that Monday night feeling that things couldn't be any better.

The first day a gale broke and the whole week was stormy, one day flights being completely impossible. Despite the winds and waves every man flew. On Saturday, the 23rd, Havens waved goodby and flew to Cleveland with a passenger.

The next day Jannus concluded his flights and flew away to Sandusky, where he caught a train.

The accident to Bleakley the first day of flying, the 20th, is of interest to builders.

William Bleakley climbed into his seat in the Benoist Tractor of the pontoon-type and slipped into the water heading out into the bay. Bleakley had an enviable reputation as a flyer before. His reputation didn't suffer by what happened. It was not his fault. The wind was too strong. As he cleared the water between the piers and tried steering to "starboard" to head into the wind his pontoon was barely lifting from the water.

As it would leave the water it would be slapped back into the trough of the waves which were rather large out in the open water. There was a struggle with the hydro and pilot pitted against the waves and wind. Bleakley in his rather high seat in the fuselage and

(*Continued on page 132*)

TECHNICAL TALKS

By M. B. Sellers

THE AVIETTE

In a recent contest between bicycles driven by aerial propellers, the first prize was won by René Bernard, who covered the 100 metres in 8 3/5 seconds (about 26 miles per hour), and the 2 kil. in 3 minutes, 25 seconds (22 M. P. H.). This race was organized by the journal "l'Auto" in order to help solve the problem of propulsion of the Aviette. Because no flapping wing machine had been specially built to make the turns of the Parc des Princes, the prize of 500 francs offered by M. Dubos was not contended for.

This calls to mind an article by M. Constantine, in which he shows why there is no hope for the Aviette as a practical means of aerial locomotion. His reasoning is briefly this: The maximum speed of a bicycle rider is about 22 miles per hour; at this speed most of the resistance is air resistance; an Aviette flying this fast will require about 200 sq. ft. of surface; at a slower speed the area required would be impractically large. As we have assumed that a bicycle rider uses about all his power to propel the bicycle alone at this speed, he certainly cannot maintain the same speed when overcoming the additional resistance due to the drift of the wings. This, of course, refers to the aeroplane aviette.

On the other hand we have the flapping wing machine, the ornithopter, and it would seem that if there is any hope for the Aviette it would be in that direction, as the ornithopter seems to be specially adapted to this purpose. To operate a rotary propeller by muscular power, a slow reciprocating motion must be transformed into a rapid rotary motion, this is not necessary with beating wings. Furthermore, it would seem that while large beating wings, for a power driven machine, would present grave mechanical difficulties, the smaller ones required for a lighter, man-propelled machine would be more practicable.

By beating wings I mean those designed for use in so-called "rowing flight," where the wing acts as an aeroplane, attacking the air at a small angle, on both the up and down stroke. This method of flight, practiced by large birds, is pretty well understood, but, so far, does not seem to have been successfully imitated mechanically. Lilienthal studied this mode of flight, and his book, "Bird Flight as a Basis of the Flying Art," deals chiefly with this subject. He estimated that the air reaction due to reciprocating motion was nine times as great as that due to uniform motion. In some early experiments with a valvular wing machine, actuated by foot power, he obtained a lift of 88 pounds (the estimated effort being 1 H. P.). This machine, however, did not reproduce rowing flight, and I merely cite it because the lift obtained was considerable. For support in rowing flight rapid forward motion is essential and the flexure of the wing arm must be automatically adjusted to the forward speed and stroke speed. I have made a model travel about 8 feet per stroke. Large birds travel a considerable distance with each stroke.

Some writers are of the opinion that the wing feathers act as valves on the up stroke. This may be true in rising or hovering flight, but it can hardly be the case in rowing flight, in which the whole wing has probably a small positive angle of attack on the up stroke; or, at least the inner portion of the wing acts as a supporting surface throughout the stroke. In my opinion a machine with valvular wings will not operate efficiently.

M. B. Sellers.

To the Editor:

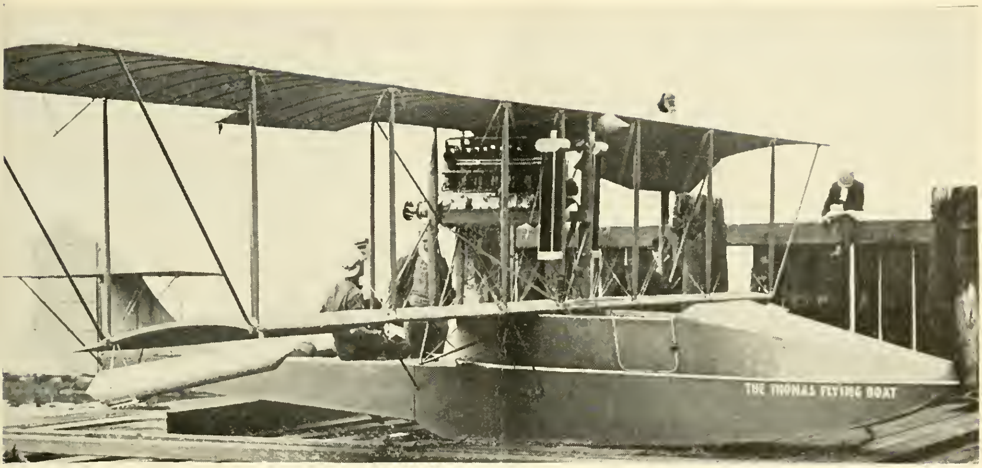
Will you be so kind to state, if possible, a fixed table which is the simplest and safest way to calculate a power plant for an aeroplane, a monoplane will take place first to get the right size power for a given load. Planes placed any practical angle. How to determine now the diameter and pitch of propeller according to speed of motor for a desired mileage in minimum winds. Or will name a book which practically deals more to solve these problems.—*J. H. B., Texas.*

Answer—The power required to drive an aeroplane depends (among other things) on the weight, speed, efficiency of wings, and resistance of the fuselage framing, etc. Unless these data are given the power cannot be computed. The efficiency of the wings depends on their section, aspect ratio, shape, number and spacing, and on the angle of attack required.

The best book for determining the probable value of these data for a proposed machine is: "Eiffel's Resistance of the Air and Aviation." Price $10. Ordinarily, a power plant is determined from the weight carried per horsepower by machines in use and these data are given from time to time in AERONAUTICS and other magazines. M. B. S.

Think very highly of your paper and wish you every success.—*R. R. B., Boston.*

I want to say that your journal is, in my estimation, the best of the aero papers and I find it of great interest.—*W. D. B., Ohio.*



THOMAS FLYING BOAT

Looking at the Thomas flying boat one begins to wonder whether or not this is really a descendant of the old four-cylinder guess-the-horsepower grass mower built by William T. and O. W. Thomas in the year 1908 at Bath, N. Y., which has since been put on the map. However, both the "boys" affirm the verity of the boat's family tree and we can take their word every time. They also promise a later type with a regular limousine body, glass windows, speaking tube, shades and all.

This machine is of just the ordinary conventional pattern but does the work. The boat is of the one-step type, there are wing-tip floats and in general follows accepted practice so far as there may be "practice" in this new branch of the flying family.

The upper plane spreads 43.5 feet; the lower, 33.5 feet. Chord 5.5 feet, spaced 5 feet 4 inches apart. Total area of supporting surface is approximately 350 sq. ft. The curve is fairly deep, being 3.75 inches, about one-third back. The planes are built in sections, amply guyed with Roebling $\frac{3}{32}$ inch wire cable with special turnbuckles.

Goodyear fabric covers, top and bottom, the planes. The laminated spruce ribs (spaced 11.5 inches apart, .375 inches wide and 1.125 inches deep) join to the main spars by metal strips. The lateral spars are D-shaped, laminated, measuring 1.125 inches by 1.75 inches for the front one and the rear spar is approximately the same in cross-section size but rectangular. The spars are spaced 44.5 inches apart. Struts are, of course, of stream line form and join the beams by the quick detachable Thomas sockets, described heretofore in AERONAUTICS. These struts are of solid spruce and measure 1¼ inches by 2¼ inches. The rear edges of the wings are flexible. The gliding angle is about one in eight, it is claimed.

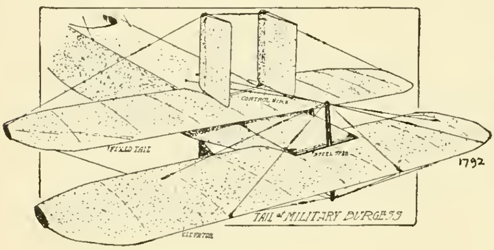
Ailerons are used for lateral stability, hinged to the rear spar of the upper plane only, and measure 13 feet by 2 feet. Cable

(*Continued on page 142*)

NEW BURGESS TRACTORS FOR THE U. S. SIGNAL CORPS

Three 70 H. P. Renault engined tractors ordered in the summer from the Burgess Company and Curtis to be built along the lines of the Burgess Tractor delivered to the Signal Corps in the summer of 1912 are now completed.

Dimensions of the new machines are exactly similar throughout to the original. (See May-June number, 1912). Many refinements are noticeable. The wing sections have been made of the same dimensions top and bottom and are thus interchangeable. The center upper panel is of the same width as the fuselage with the two small sections on either side, thus doing away with a central juncture of the upper wing and the uprights immediately in front of the operators.



A wind shield is provided and ample room for instruments. Seats are upholstered and neatly finished in leather.

The machine is supported on two pairs of vertical braces instead of diagonal braces as formerly; simplifying not only the number of spare parts required for emergency equipment, but also greatly reducing time required for installation.

The new Burgess treated Irish linen is furnished on the fuselage, wings and rudders. This has been found to increase the speed of the machine considerably and is absolutely weather proof.

The gasoline supply is carried in two tanks supported on each side of the fuselage and is fed to the engine by gravity, thus doing away with the added complication of pumping devices at a cost of slightly additional head resistance.

The machines are equipped with mahogany Burgess propellers of the two-blade type.

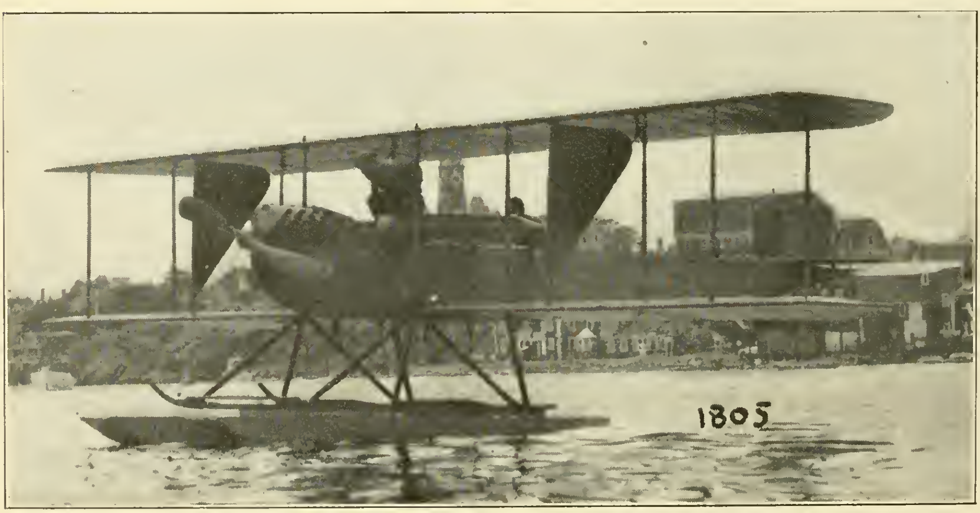
The photograph shows the Model H Burgess Tractor, three of which have been ordered by the U. S. Signal Corps. The first two machines have been tested out successfully.

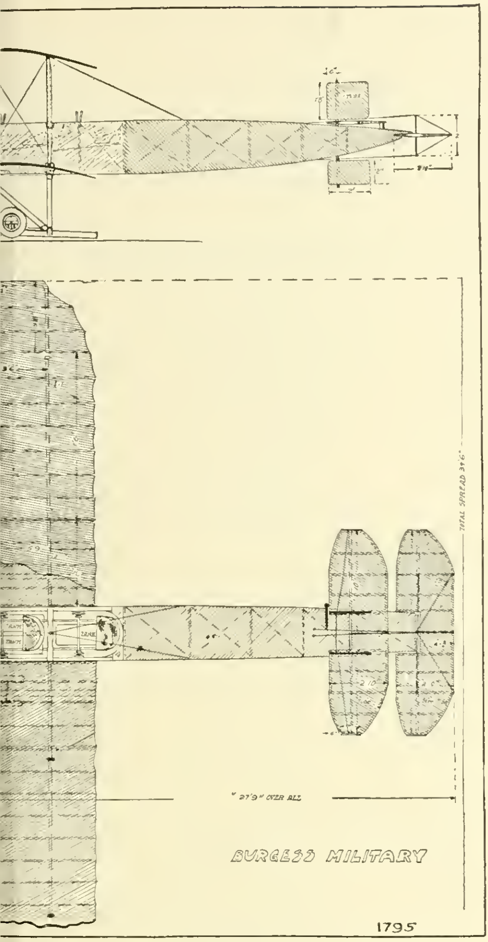
The hydroplanes on which the tractors are mounted are of special type. The machine is easily convertible into a land machine, the work being accomplished in less than fifteen minutes. The whole machine can be taken down ready for shipment inside of half an hour.

The speed of the machine is increased over the 1912 type by three or four miles on account of the refinements in construction and the use of the Burgess linen. It now has a speed ranging from 45 to 60 M. P. H.

SIGNAL CORPS TEST OF 100 H.P. RENAULT

The details of the Signal Corps' test of its 100 H. P. 12-cyl. air-cooled Renault motor for the big biplane now completed by the Burgess Co. & Curtis, are of interest. The test was made at the Naval Experiment Station, Annapolis, Md., under the supervision of Lieut. N. H. Arnold. The motor was mounted





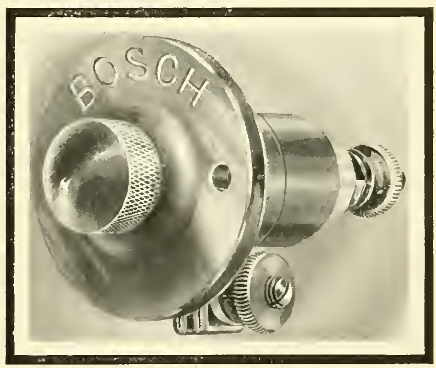
through the medium of adjustable pillars and wooden beams to a cast iron testing base. It was clamped to the wooden beams, which were in turn clamped to the wrought iron pillars. Adjacent to this base was a second test base, on which was mounted a water brake with its necessary piping and scale beam. The half time shaft of the motor was rigidly coupled to the shaft of the water brake. As this type of Renault motor drives through the half time shaft, the revolutions delivered by it are one-half the actual speed of the motor itself. On a third base adjacent to the water brake, a 70 H. P. Sprague dynamometer was mounted, connected by rigid coupling to the free end of the water brake shaft. The cooling was effected by a 60 H. P. turbine driven blower connected to an air shaft about 18 inches diameter. The nozzle was shaped to drive the air over the cylinders, the blower being about 10 feet from the motor under test. The motor at 1,800 R. P. M., the half time shaft being 900, developed easily 100 H. P., about 75 H. P. being consumed in the dynamometer and 25 H. P. in the water brake.

The aeroplane, which must be able to fly as low as 38 M. P. H., weighs 2,600 pounds, has armor plate protecting aviators, consisting of Disston's steel .08 inches thick, 3.4 sq. ft., and has a carrying capacity in excess of any previous American aeroplane. The striking features are its immense size and separation between planes. A large amount of steel tubing is used in place of wood struts and wing members. The landing chassis is particularly strongly built.

BOSCH PUSH BUTTON SWITCH

A new switch put out by the Bosch Company will interest every aviator. With this the magneto is "on" except when pressure of the foot shorts it; or it may be instantly locked in either "on" or "off" position. It certainly "looks bad" to find a knife switch in use—and it is more than occasionally.

The Bosch press button key switch is extraordinarily simple in form and meets the approval of those who desire a positive and mischief-proof method for either temporarily or permanently short-circuiting their magnetos.

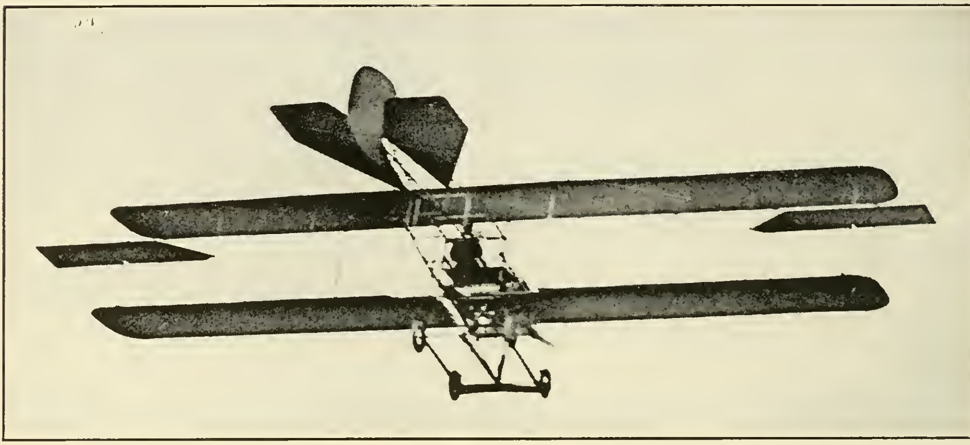


It may be located on the floor board and by the pressure of the foot the magneto can be temporarily short-circuited. This is an obvious advantage when gliding down. Release of the foot pressure immediately removes the ground connection, afforded by the switch, and the magneto will resume its intended operation.

When the button key is inserted and turned to the right or left until it snaps into position, the connection between the magneto primary circuit and ground is open; when pressure is placed upon the key, or the key is removed, which is accomplished by turning it one-quarter turn to the left or right, a connection is made that grounds the primary winding and the magneto is made inoperative.

The Bosch press button key switch is furnished only in nickel finish with the button key as a standard. List price $1.50.

CURTISS 100 H. P. MILITARY TRACTOR



The new military tractor recently shipped to the army aviation camp at San Diego is very similar to that of last spring, described in the February number. Following are the principal dimensions and chief points of difference.

Wings, one piece, upper, 41 feet by 66 inches; lower, 31 feet by 66 inches.

Ailerons, 12 feet by 3 feet; in order to do away with the usual diagonal strut at the end of the wing Farman flaps were tried out, but the control proved so much less positive than with the standard ailerons that the latter were restored, the outer ends secured to posts or struts depending from the trailing edge of the upper surface.

Fore and aft, the machine measures 25 feet; tail of fuselage, 14 feet; body, including motor, 7 feet; rudder 4 feet. Tail surfaces and rudder same dimensions as "English" flying boat-standard, described last issue.

The "full floating" fuselage, as shown by the pictures, appears to be new and patents have been applied for. Three sets of heavy rubber bands on each side support the fuselage in the heavy four-wheeled chassis, assisting very decidedly in absorbing the shock of hard landings. The same system has been tried out on the Curtiss hydroaeroplane and the flying boat.

The wings of this machine are practically the same as used on the standard machines, except that they are made in one piece each side of the chassis, instead of the panel construction, which gives them a little greater strength. The beams are very strong and heavy at the inner end and taper all the way out to the tip of the wing, giving them the maximum of strength in proportion to the load at each point and reducing the weight. The planes are very rigid and quickly demountable by the removal of four bolts, one each at top and bottom of either plane.

The chassis with the wings removed is only 42 inches wide at the points where the wings attach, and the over-all width of the running gear is about 65 inches. The tread of the wheels is 56 inches, which is standard road gauge so that the chassis may be towed along a standard road if necessary.

The tail surfaces and elevators are the same general shape used on the flying boat.

The fuselage is constructed of four members of white spruce, which are tapered from the rear beam out to the extreme end, thereby reducing the weight in proportion to the strain at each point.

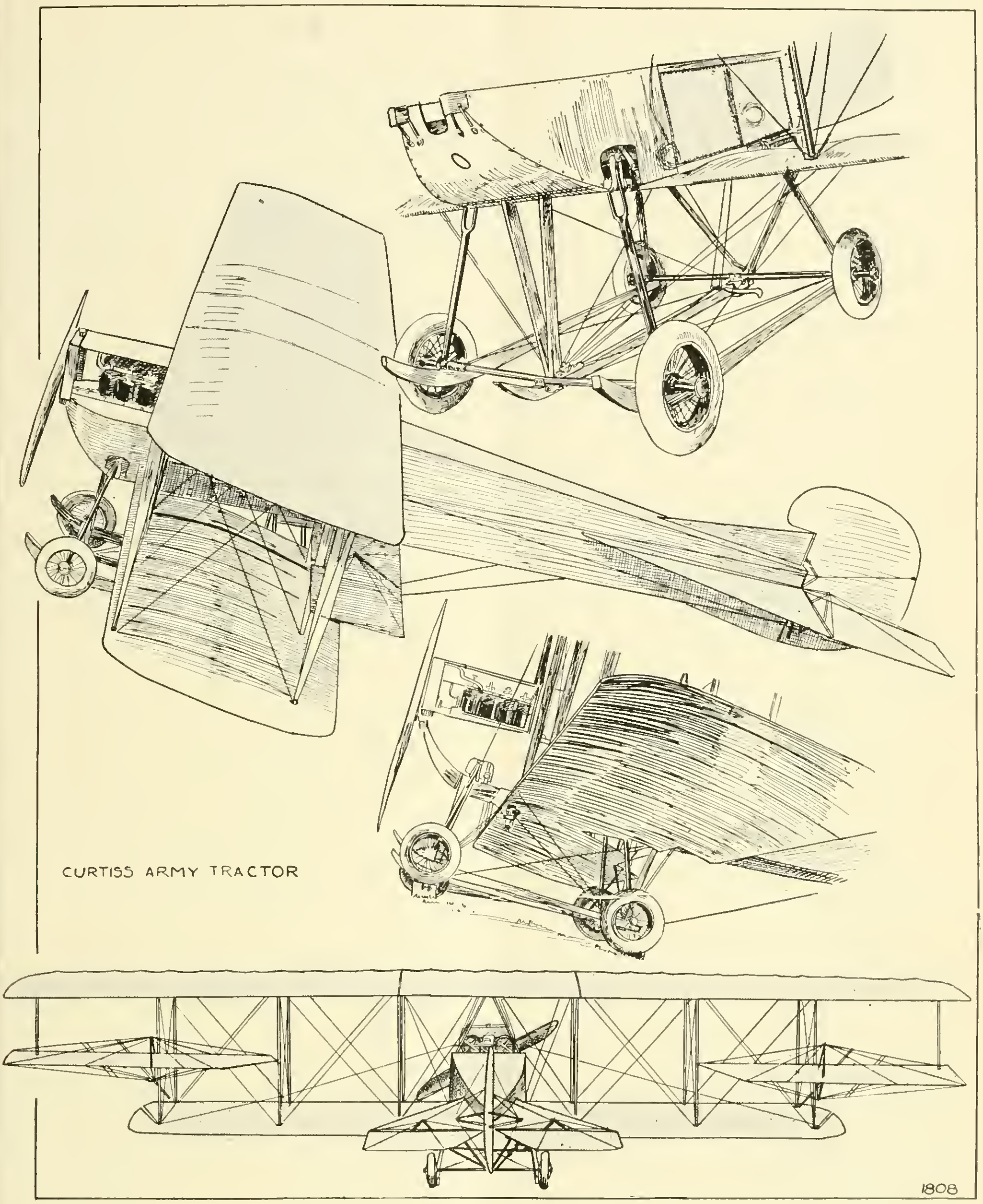
A new system of wiring and bracing is used which does not require any holes through these corner members, so a lighter piece may be used and the same strength secured as a larger one fastened in the ordinary way with holes through at each joint.

The lateral balance is by ailerons, separately connected so that they can either be operated in unison or independent of each other. It is claimed the machine can be balanced by either in case of accident to the other.

The tail surfaces are quickly and easily detachable for packing up. The entire fuselage is covered to reduce head resistance and the seats are placed side by side as in all standard Curtiss construction. The field of view from this machine is exceedingly good, as the seats are about midway between the front and rear beams over the lower plane so that a good downward angle of vision is obtained and for looking directly downward a space of 12 inches is left alongside the fuselage out to the first rib on each side.

The engine is located directly in front of the operators and the carburetor projects through the dashboard into the cockpit where it may be adjusted by either operator and is at all times under observation.

The gasoline tank is placed under the seat and has a capacity of 40 gallons. There is an auxiliary tank on the dashboard which has a capacity of two gallons and is kept supplied by a mechanical pump driven by the engine from the main tank. There is a plate-glass



CURTISS ARMY TRACTOR

window in the front of this auxiliary tank which answers two purposes—the level of gas in this tank may be seen and also the stream of gasoline coming in from the pump, and this being directly in front of the pilot, any failure of the pump to work would be quickly noted. If, for any reason the pump should stop working, it is only necessary to throw over a small lever on the front of the tank which controls a distributing valve and give a few strokes on a hand air pump, which is located within easy reach of either operator, when the level in the auxiliary tank will be maintained as before by air pressure in the main tank.

The propeller is a 9-foot by 8.5-foot pitch two-blade Curtiss, driven direct from a Curtiss OX 90-100 H. P.

The radiator is mounted on the forward end and just back of the propeller and the hood over the engine is attached to the rear edge of the radiator, similar to an automobile. The air coming through the radiator and around the cylinders is deflected out on each side and away from the operators by curved metal shield which forms the dashboard and closes the cockpit away from the motor.

The hood over the engine has a small upcurve which deflects the air over the heads of the operators and stops the strong blast in the face, which is common to the ordinary tractor.

This machine is much more convenient for tearing down or reassembling than the standard machine, as the power plant and running gear stay intact when packed for shipment.

The fuselage is easily and quickly attached when setting up, the wings being in one piece are more easily handled so that the assembling can be done in a very short time.

This machine handles exceptionally well on the ground and may be turned around without outside assistance on the ground in a very small space. It is fitted with a standard folding shoulder yoke and dual wheel, which gives either operator control at will. It can, however, be fitted with a single throw-over wheel if required for military work.

This tractor is the one ordered to be fitted with a 160 H. P. Gnome over which a suit was brought against the seller, DeVillers, alleging motor not up to standard required. (See drawings February issue.)

The disappointment occasioned by the failure of the motor to meet test requirements, after the Curtiss Co. had paid some $10,000 in cash for it, was accentuated when the motor itself was attached on a writ of replevin by a Mr. Prince of Boston. The Government was then asked to allow the maker to enter a machine equipped with one of the new Curtiss 150 or 200 H. P. motors now under construction, the loss to be entirely on the maker in case the machine failed in any way to meet the requirements established for the machine equipped with the Gnome motor.

"Find enclosed check for $3.00 for my subscription. I would not be without it. I was one of your first ones and will stick."—*G. E. Y., Omaha, Neb.*

A YACHTMAN'S VIEW OF THE AIR BOAT

(*Continued from page 125*)

with his big pontoon offered great resistance to the wind and his efforts to "point up into the wind" proved unavailing and he was sheered off his course, along the trough of the waves, with wind "abeam," and in about a minute from the time of his start at the platform was dashed "head on" against a rocky end of the Island of Gibraltar. Committee boats laying out for emergencies headed for the rocky point quickly. Bleakley emerged from the wreck of his craft saying, "I'm all right," and he was, too. Had Bleakley gotten to windward 50 feet he would have cleared the rocky point. In the absence of a rudder and with a straight-sided pontoon offering the greatest possible resistance to the waves and with a high wind to boot, there was only one outcome—a smash.

Leaving the water clean and quick, and soaring at will in the air, circling the harbor, swooping down near the water, then up, then turning, over steamboats, docks or shore, sometimes close and sometimes far away, always smiling and occasionally waving to those on the piers. Control seemed to be the predominating virtue about the flying-boats in all their flights at Put-in-Bay, whereas, the pontoon-type hydros seemed more awkward in the water and less in their element. In the air, too, the flying-boats seemed more pleasing to the eye of the yachting crank on account of their more shipshape lines and more bird-like appearance which seemed to give them grace and make them seem better adapted to flying, at least, about the water where comparison could be made with the lines of the sail and power yachts anchored nearby.

At last the enjoyable occasion was over. The engines had worked perfectly, the Roberts motors in the Benoist machines, the Curtiss and the Austro-Daimler in the Thomas Bros.' machines and the big 96 H. P. Curtiss in the Curtiss flying-boat. Not once, to the committee's knowledge, did any body fail to start when he intended to. Barring the accidents the machines were under perfect control, except it appeared that there should be some sort of a rudder for the pontoon-type machine that would act in the water, and probably a larger rudder on the flying-boats to give them a deeper action and more "surefootedness" in the water, to prevent leeway and to insure their being able to turn into the wind to get their elevation at all times. It appeals to a yachtsman to have as good a rudder as possible on a flying-boat when it starts with the wind abeam and has to turn into the wind to get up out of the water.

The novel experiences, the knowledge gained, and last but best, the enjoyable companionship with the good fellows connected with aviation who were at Put-in-Bay will always be remembered by the Committee on Aviation of the Perry Centennial, all of whom are boosters for the new aquatic sport —flying-boats.

"There ought to be a law against aviation," said the humane citizen.

"There is one," replied the cold-blooded man. "The law of gravitation is continually interfering with it."—*Washington Star.*

Dr. A. F. Zahm and Naval Constructor Hunsaker are in Europe getting information on foreign laboratories.

It (AERONAUTICS) is the only book on aeronautics that is worth while.—*W. B. E., Utah.*

Witty Chap—"Learning this piece of music makes me feel like an aviator."

Dense Girl—"How so?"

Witty Chap—"Trying to conquer the air."

THE GLOBE.

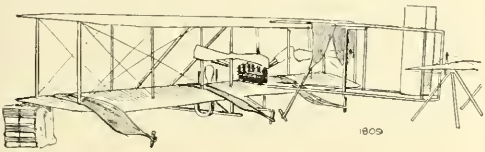
Aviator Weds Nurse.—*Headline.*

The ideal bride for an airman.—*Evening Sun.*

NEW DEVELOPMENTS IN AERONAUTICS

PUTTING THE 'PLANE TO BED

In mooring the army's machines, five bands are used, two on the engine section, one on either side of the motor, and one at either end of the planes. The tail is held down by a fifth band thrown over the tail spars, the elevator being held in position by a couple of tripods. These bands are drawn taut and held in position by tent pins. The motor and propellers are protected by covers made especially to fit them.



The bands are made of double thickness ten-ounce duck with a six-foot rope attached to either end. The bands are ten feet long by two feet in width. This method of mooring proved very successful, the machine at times being subjected to wind of 60 miles an hour and severe rain and sleet storms.

You certainly put out an interesting book. —*Valentine & Company.*

THE MARS BIPLANE

The Deutsche Flugzeugwerke (German Airship Works) in Lindenthal near Leipzig, produces the Mars biplanes and monoplanes and have obtained success with their machines. The Mars biplane is "distinguished for its great stability, unusual gliding ability, enormous carrying capacity and ascending fitness." In the biplane all parts correspond to the Mars monoplane, inasmuch as the carriage, the body, the installing of the motors, the seat arrangement and the rudder are the same.

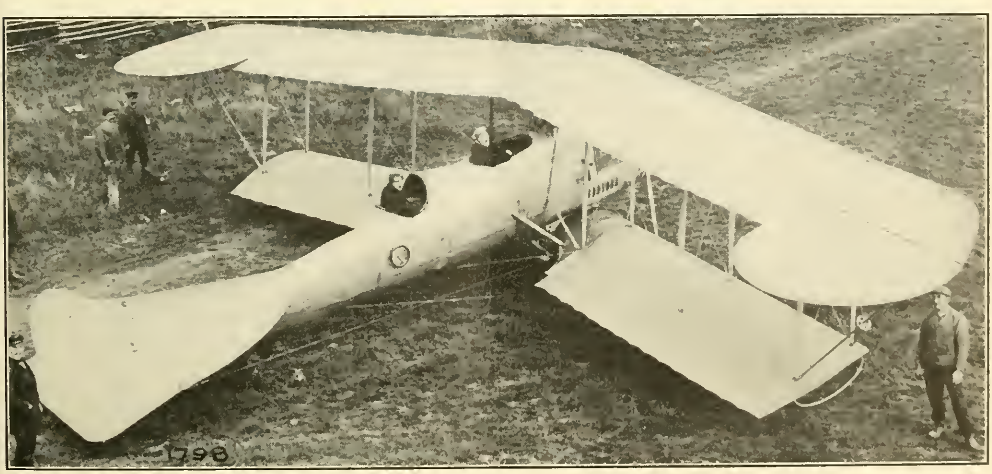
By those means it is possible to substitute parts of a monoplane for a biplane and vice versa.

The total carrying surface of the Mars biplane amounts to 46 square metres; the upper deck has a span of 18 metres, the lower one 13 metres. The span can be reduced to 13 metres for the whole apparatus by folding the exterior ends of the upper deck, so it can be placed without difficulty into a small hangar. The length of this machine is 9 metres. In constructing this and the Mars monoplane especial emphasis was laid on quick demounting and speedy re-erection of the same, and the machine responds in this point to all requirements of the military department.

The speed under full load (*i. e.*, pilot, passenger and gasoline for 4 hours) is 120 kilos. The material used is of the very best quality and consists of seamless steel tubing, knotless ash, pine and spruce-wood veneering. The Rami covering is especially impregnated and is protected against climatic influences by a particular varnish.

In front of the body are comfortably and ingeniously sheltered the motor, benzine tank and a little further back passenger and guide, and the body itself consists of a fish-like boat of little air resistance and greatest firmness. The radiator is situated in front of the motor.

The propeller is directly affixed on the motor-shaft. The high-profiled wings are strongly outlined and possess inherent stability through upward bent end-flaps. All control cables are of piano wire. The steering wheel is attached to a lever and by tilting the former down or putting it back the rudder is put in action. By turning the steering wheel the lateral stability is maintained, while the lateral steering is obtained by means of a foot-lever in such a way that by pressing down the right

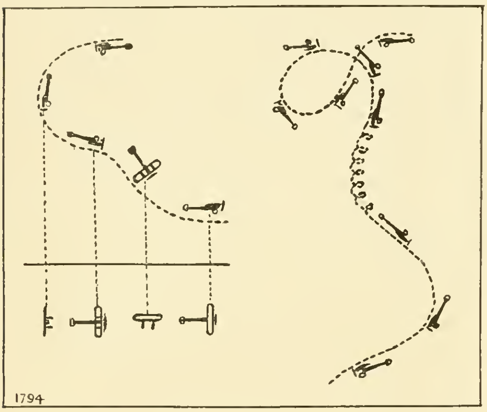


foot the steering corresponds to the right and by pressing down to the left will result in steering to the left side.

The extremely staunch carriage consists of generously dimensioned steel-tubing resting upon four running wheels. The dampening planes can be "displaced while in flight by a patented contrivance which is operated by a specially adjusted hand-wheel. This innovation makes it possible that the pilot doesn't need to attend to the elevation rudder while in flight, with resulting relief in guiding the machine."

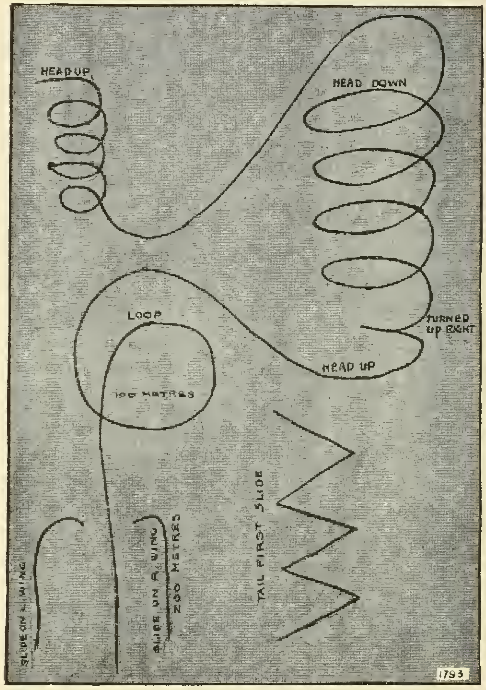
PEGOUD'S LOOP

The first illustration shows the complete loop made by Pegoud with his Bleriot on Sept. 21. Three different times he "tried" to upset sideways by a side slip on the wing, but could not accomplish this, the c. of g. of the machine being too low to permit this. In an opening of blue sky among clouds, a glimpse was caught of the machine in a tail first plunge in a vertical position. The machine was then righted after a side slip on the wing (the machine sliding sideways



downward). Pegoud next tried a complete revolution, taking a vertical drop and turning over sideways. His fourth experiment consisted in flying vertically upward from the force acquired by a sudden descent. Pegoud then did another tail first dive, then ascending to about 800 metres. From this height he suddenly dipped towards the earth and succeeded in making a complete "loop-the-loop," the loop being about 100 metres in diameter. Having accomplished this Pegoud again described the letter S, his head downward, and turning over sideways, as described last month. Then he let go of all controls. The machine descended at first in a dive, then ascended and then made a tail first dive, Pegoud then taking hold again of his controls, these slides producing "a delicious sensation." "I have executed what appeared to be the most difficult feat, the turning over sideways completely and bringing back to equilibrium. Besides I have vertically ascended and have looped the loop. To terminate the demonstration I have described the letter S with the lateral righting of the machine (*i. e.*, turning over sideways)."

At Brooklands, England, he repeated his performance in a strong wind on September 25, making, in different words, a slow spiral in the longitudinal sense, the axis of the spiral being approximately horizontal, after a vertical dive and turning the machine on its back. Again he looped the loop by diving for a comparatively short distance with engine on, dropping his tail, rising vertically by momentum.

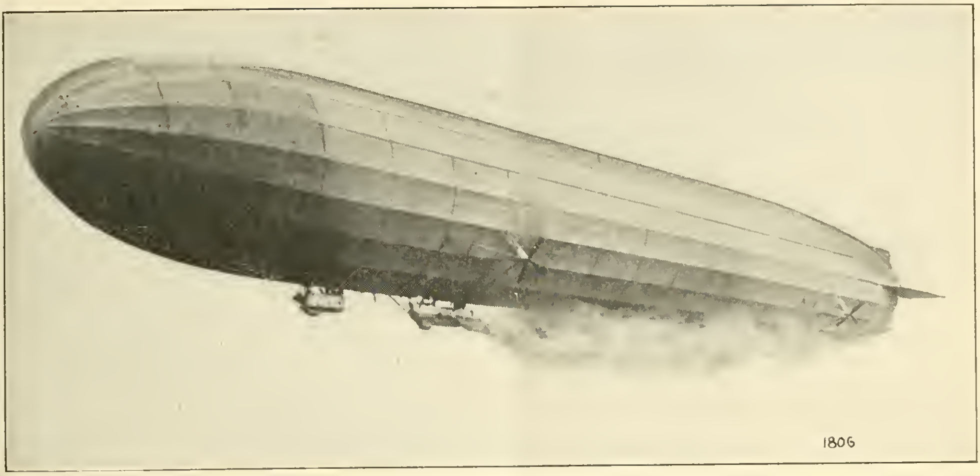


The machine used has the top pylon increased in height so that the upper bracing to the planes is at a better angle and the bracing is by stranded cable. The elevator flaps are those of the 70 H. P. Bleriot and straps pass over the aviator's shoulders.

Pegoud proves it is possible to capsize a machine and right it again by exercise of cool judgment if there is sufficient air room and no disturbing air currents.

Later, at Buc, these stunts were continued, Pegoud doing the loop five consecutive times. Lieut. Poulet, of French army, has also flown upside down. The simple "S" was illustrated in the September issue. The second illustration is from Pegoud's own sketch.

One, Chanteloup, on a Caudron 80 H. P. biplane is reported to have turned his machine "over on its side and let it sideslip for some distance, and then gradually got it upside down, and flew in that way for a few seconds before making another dive and regaining the normal flying position."



THE WRECKED ZEPPELIN

The Zeppelin L-2, which burned in the air on October 17, killing the entire party aboard, numbering 28, was the first of the new ships of battleship class built under new specifications.

A third car has been added, way for'ard and the two engine cars have been re-balanced. This bow cabin is the "bridge" of the new ship.

The L-2 represented the highest engineering development of the rigid airship. Dwarfing all preceding Zeppelins, it was the first true unit of the German navy in its fleet of "aerial battleships," of a type and power which answered the Admiralty's demand for offensive action.

The L-2 was sustained by the enormous volume of 27,000 cubic metres of hydrogen, disposed in 24 entirely separate gas chambers, placed end to end throughout the 526 feet length of hull. Her tremendous buoyancy sustained her own weight of 24 tons and an additional cargo of 12 tons. Her four Maybach motors each developed 225 H. P., 900 H. P. in all. These engines were disposed in pairs, one pair in each engine gondola, fore and aft. One engine of each pair could drive both propellers above the gondola, on either side of the hull. Two of these engines—one forward and one aft engine—could drive the airship up to an altitude of a mile and a half.

The radius of action of the L-2, fixed by the attainments of preceding Zeppelins of proportionately smaller size, was given as 2,000 miles by employing only three-fourths of her fuel capacity The percentage of gas leakage in the case of the L-1, which was lost recently in the North Sea, was 1½. the gas chambers in the L-2 being supposed to be virtually impermeable.

Both of these latest Zeppelins were known to have attained absolute control of the expansion and contraction of their gas lift, due to the perfection of a system of circulating currents of air, driven by pumps through the air space between the gas chambers and the inclosing hull.

In the captain's "bridge," were placed the valves, pressure gauges, thermostats, barographs, steering wheels and navigating charts. The whole gondola was closed in with a steamer deck canopy and glass windows. Leather divans were placed for the captain and his officers.

The officers' quarters were amidships, built closely into the bottom of the hull. This was a comfortably furnished cabin, 100 feet in length. A long gangway of V shape ran from the bow to the stern of the ship and connected the navigating "bridge," motor gondolas and quarters. It continued upward in a curve to the rudders at the stern, which was reached by a companionway.

The speed developed by the L-2 during her first "shop trials," over Lake Constance, before she proceeded to Berlin, was 54 knots, or 62.18 statute miles an hour. This was accomplished with 390 more horsepower than the L-1 possessed. The Mauretania's fastest average speed is 27.04 knots. The L-2 made this great speed with motors weighing only 3,924 pounds, or seventy-six pounds lighter than the same motor that drove the L-1. Motors and the crew of twenty-two represented 3½ tons. Fuel for a 2,000-mile run amounted to six tons, leaving 2½ tons for wireless equipment, guns and ammunition.

The airship's armament, as demanded by the specifications, published last year by a semi-official army journal, was to be four guns of the quick-firing type, each weighing fifty pounds. One was to be mounted on top, and three to be carried at equidistant points along the gangway, one forward, one aft and a third amidships, in the officers' quarters. The ship could carry two tons of ammunition, or when leaving three guns behind could carry one and a half tons of bombs, according to the mission undertaken.

The L-2 was not the largest airship which the German Admiralty contemplated. Her successors, according to the published estimates by army journals, were to attain sizes

up to 30,000 cubic metres. Zeppelin engineers had expressed the opinion that airships of that size were entirely feasible. A ship of 30,000 metres would arrive at the colossal dimensions of 650 feet, with a diameter of eighty feet, and command 1,400 to 1,500 H. P.

T. R. MacMechen.

The reports state that the cause of the burning, or explosion, of the L-2 was a fire amidships. No definite information is available and from the lack of information it is assumed the Government knows the cause and is not disturbed. As the engines are nowhere near amidships it is possible, if there was a leakage of gas, due to a defect in any of the gas chambers inside the hull, the hydrogen would escape into the air spaces between all the gas chambers and the inclosing hull. Entering the stairway shaft, it would rise to the top, and if the top hatchway was open would escape into the air. Mixed with air, hydrogen will explode instantly, or coming in contact with a spark. If the accepting commission was testing the quick-firing gun a spark might produce the explosion, although it was said that the gun's silencer made the ignition flameless.

The cable dispatches state that the flames first burst from the point where the officers' quarters are located. In the ceiling of the cabin is the hatchway, opening into a shaft through which a spiral stairway ascends between the two central gas chambers and comes out on top of the hull in an observatory, in which a quick-firing gun is mounted for protecting the airship from attack by aeroplanes overhead.

The two motor gondolas are situated, one 160 feet forward and one 160 feet aft of the amidships section, where the officers' quarters and wireless equipment are located. Above these engine gondolas the bottom of the ship's hull is fireproofed with aluminum sheeting. A ladder reaches from the deck of the gondolas to the gangway above. The gondolas are partly exposed, in order that any escaping gasses may be blown away. It is difficult to understand how they could climb the ladder and enter the hatch above.

A writer in *La Genie Civil*, before the late accident, in discussing the relative merits of dirigbles, mentoned that of the nine destructions of Zeppelins since 1906, two were caused by explosions. "This relative frequency of explosions deserves some consideration and we may state that the system itself favors these accidents. There is between the outer cover and the small elementary balloons closed spaces where the least escape of hydrogen—and there is always an escape of hydrogen—forms a detonating mixture; afterwards, all that is needed to cause the catastrophe is some little casual circumstance. The material of the covering is not stretched and there may be developed between this material or somewhere on the framework a rubbing of some sort that would develop a little bit of electricity and cause a spark."

As the day of the catastrophe to the L-2 was fine one would eliminate the chance of explosion by induction of electricity.

Count Zeppelin has under way in the Zeppelin factory a new and greater dirigible and this he plans to pilot himself across the Atlantic to the United States and may even cross the continent to the 1915 World's Fair at San Francisco. The North Sea is now a mill pond to the Zeppelins and crossing the Atlantic in two days' will make it nothing more than a large lake. The Hamburg-American line, which is heavily interested in the Zeppelin Company even plans regular trans-Atlantic passenger trips.

ZEPPELIN PROBE RESULT

Berlin, Oct. 29—The explosion is attributed in the official report to a partial vacuum formed in the centre gondola behind a new kind of windshield, used for the first time. It sucked the gas escaping from beneath the aluminum structure of the dirigible into the gondola, where it was exploded by a spark from the motor.

A GASLESS DIRIGIBLE

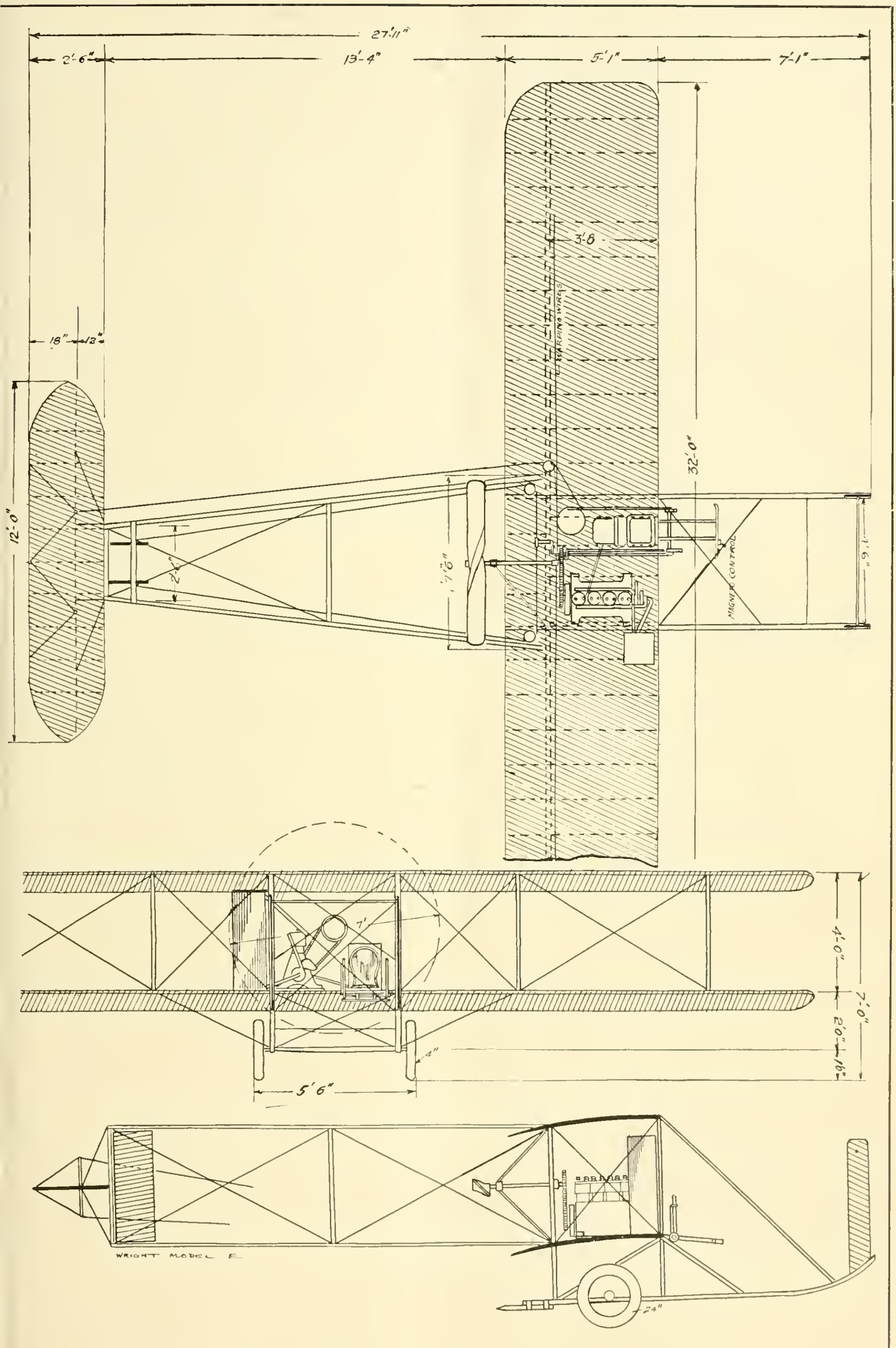
Apparently few have given the subject thought, but there seems to be no reason why there should not be practical airships which do not use hydrogen for sustentation. A hot air dirigible ought to prove useful—its first cost would be less, upkeep less, operation cheaper and almost equal to hydrogen in lifting capacity.

In the March, 1909, issue of AERONAUTICS is an airship of this type roughly outlined by C. W. Sirch; one made in sections, *a la* Zeppelin, using fireproofed fabric for a covering over a frame work composed of a central tubular spine with truss rods extending outward therefrom like spokes of a wheel and wires for rims, burners in every compartment, companionway underneath the length of the bag, air compressor, propellers at extremities of the bag, etc.

A curve plotted by Mr. Sirch after calculating the per cent. buoyancy of air at temperatures rising to 1,000 degrees Fahrenheit shows that air at approximately 440 degrees has the same buoyancy as hydrogen gas. Materials have been subjected to a temperature of 440 degrees without damage, although it is designed to raise the temperature only about 100 degrees over atmospheric. The textiles used which are subjected to a high temperature exhibit a remarkable immunity from the effects of heat. It is claimed the contents of the bag will lift 65 pounds for every degree of rise in temperature.

In manœuvering it is necessary only to additionally heat the air sufficiently to rise above obstructions. Either end can be elevated or lowered by warming or cooling the air in the compartments situated there.

The use of air disposes at once of the costliness of hydrogen, danger from inhalation, explosion and fire, leakage and replenishment in transit, ballast and the difficulty of obtaining a supply requiring a generating plant.


27'11"
2'-6"
13'-4"
5'-1"
7'-1"
3'-8
WARPING WIRES
18"
12"
12'-0"
32'-0"
2'-6"
7'6"
MAGNETO CONTROL
9'-1"
7'
4'-0"
7'-0"
2'-0"
16"
4"
5'6"
24"
WRIGHT MODEL E

WRIGHT AUTOMATIC STABILITY SYSTEM

A patent just issued to Orville and Wilbur Wright, assignors to the Wright Co., will be read and digested with great interest by all in aviation.

This patent was filed Feb. 10, 1908, and issued Oct. 14, 1913. The number is 1,075,533.

From the following it will be seen that it is intended to provide automatic means whereby the fore and aft balance of the machine may be maintained at a determined angle of incidence, and means whereby the angle of incidence at which the machine is automatically balanced may be varied at the will of the operator while the machine is in flight: and an automatic mechanism for maintaining the lateral balance of the machine, the automatic controlling mechanism being adapted to adjust the angles of incidence of the opposite lateral portions of the aeroplanes and the position of the vertical rudder to restore the lateral balance of the machine if the same should be caused to tilt to one side or the other.

The device consists in short, according to the claims, of the combination with an aeroplane and means for maintaining balance:

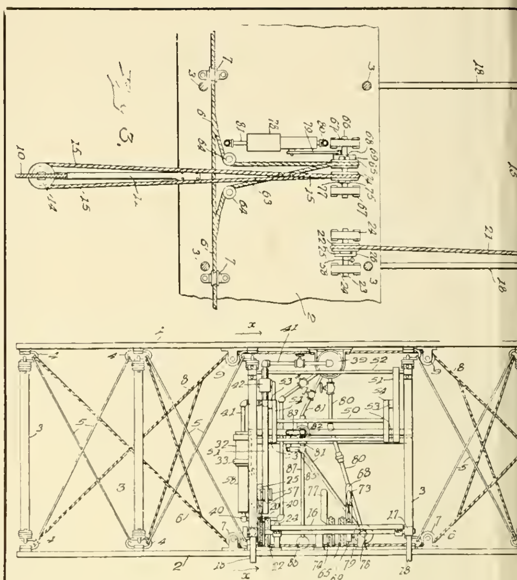
(1) Of (*for automatic longitudinal balance*) a movable horizontal "vane" actuated by air currents when the course of the machine varies, means controlled by said vane for operating the elevator, connections allowing the angle of incidence at which the machine is automatically maintained to be varied by the operator, a vane so mounted it can rise and sink without changing its angle with aeroplane, means for adjusting the angle of the vane with the aeroplane, means for securing same in adjusted position.

(2) Of (*for lateral automatic balance*), in a machine whose wing tips may be "twisted" a pendulum mounted to move laterally, means for producing said twist, connection between pendulum and means for twisting, manual means for same, means for separating the one from the other, means to allow pendulum to operate on a turn as well as otherwise, a fluid pressure cylinder, pistons, valves and connections.

Another claim covers the simple combination of means carried by a plane and co-operating therewith to automatically twist said plane, or to move lateral and portions to different angles of incidence, so that if ailerons should be decided in the suit pending to be an equivalent of warping, the system would be barred as far as automatic operation of ailerons is concerned. There are 42 claims in all, concisely and strongly drawn.

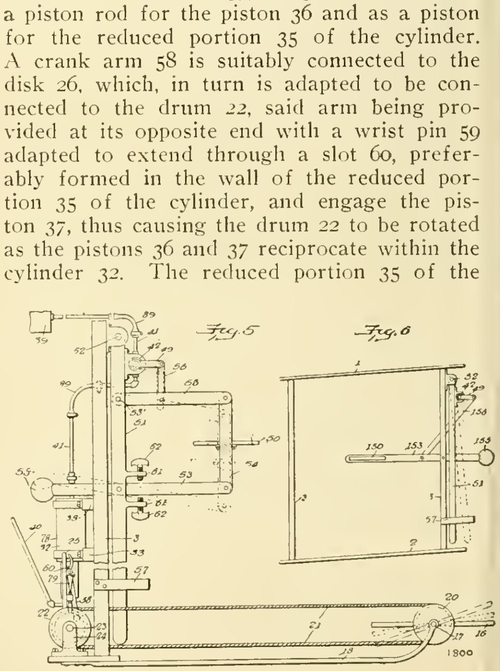
The other Wright patents in this country are: 821,393, issued May 22, 1906, now in suit (see AERONAUTICS, page 111, Sept., 1913); 987,662, of March 21, 1911, covering the use of vertical vanes and ailerons. (See AERONAUTICS, page 192-193, May, 1911.)

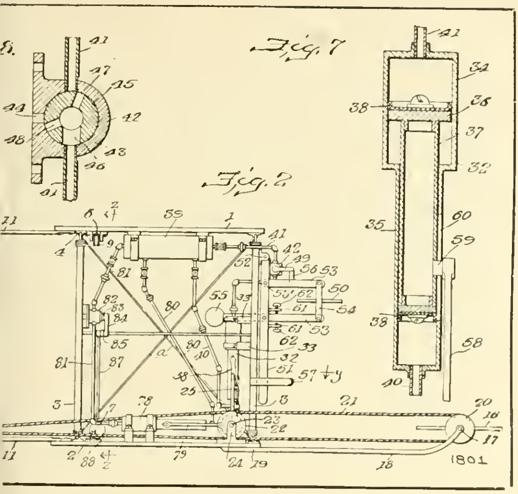
The new patent described in this issue is similar to one issued in England, described in AERONAUTICS, Sept., 1909. This device has been lately used most successfully in a simplified form.



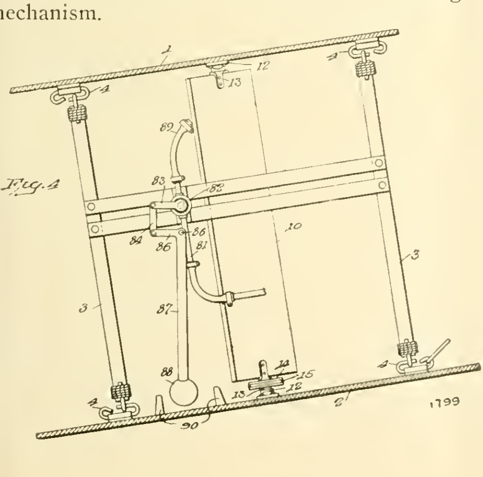
LATEST WRIGHT PATENT.

A fluid pressure cylinder 32 is suitably mounted and comprises an enlarged portion 34 and a reduced portion 35. The enlarged portion is provided with a piston 36 which in turn has a member 37, adapted to serve as a piston rod for the piston 36 and as a piston for the reduced portion 35 of the cylinder. A crank arm 58 is suitably connected to the disk 26, which, in turn is adapted to be connected to the drum 22, said arm being provided at its opposite end with a wrist pin 59 adapted to extend through a slot 60, preferably formed in the wall of the reduced portion 35 of the cylinder, and engage the piston 37, thus causing the drum 22 to be rotated as the pistons 36 and 37 reciprocate within the cylinder 32. The reduced portion 35 of the





cylinder is connected with an air storage receptacle 39, by pipe 40, normally in open communication with both the cylinder and the air tank. A constant air pressure is exerted on the piston 37. The enlarged portion of the cylinder is connected with the air tank by means of a pipe 41, which is provided at a point between the cylinder 34 and the tank 39, with a three-way valve 42 adapted to be automatically controlled to regulate the admission of air to the cylinder, as shown in Fig. 8. The port 46, is of such a size that it is at all times in communication with the outlet portion of the pipe 41. The other ports are so arranged to bring either the port 47 into alignment with the inlet portion of the pipe 41, or the port 48 into alignment with the exhaust port 44 in the casing 43, or the valve member may be turned so as to move both of the ports 47 and 48 out of alignment with the respective ports of the casing, thus closing the outlet pipe 41 against the passage of fluid and locking the piston against movement. The valve member 45 is provided with a suitable operating handle or arm 49 which is adapted to be connected to the automatic controlling mechanism.



FOR LONGITUDINAL STABILITY

The automatic controlling mechanism preferably consists of a small horizontal plane 50, mounted upon the frame of the machine, at a small negative angle with reference to the main aeroplanes, free to have a limited vertical movement, and so connected to the arm 49 of the valve member 45 as to actuate the valve as the regulating plane moves up or down. But in order to rise or descend it is necessary to change the angle between the regulating plane and the main aeroplane and adjustment of some kind to permit this change at the will of the operator while the machine is in flight is desirable. There are provided one or more arms 51, which are rigidly mounted on a shaft 52 pivotally connected to the frame of the machine and which extend downward. Pivotally connected to each of the arms 51 are links 53, which are approximately parallel and extend outwardly from the arms 51 and the frame of the machine and support between their outer ends the rigidly mounted plane or vane 50. They are pivotally connected at their outer ends by a connecting member 54. The two upper links 53 are rigidly mounted on a shaft 53′. The vane 50 may be mounted upon a single arm, as shown in Fig. 6. A suitable counterbalance 55 is provided for the vane 50. The frame supporting the vane 50 is connected to the arm 49 of the valve 42. As herein shown, one of the upper links 53 of this frame is connected to the arm 49 by means of a pivoted connecting link 56. The pivotal supports for the arms 51 permit the frame supporting the vane 50 to be moved relatively to the main frame of the machine and thus adjust the vane 50 so that its plane forms any desired angle with the plane of the main aeroplanes. A suitable friction clutch is provided for locking the arms 51 in their adjusted position, such as the spring clip 57.

If desired, suitable stops 61 may be provided for limiting the movement of the links 53 and the vane 50.

In use, the vane 50 is adjusted by means of the arms 51 to such angle with the main aeroplanes as it is desired that the aeroplanes shall maintain with relative wind. If the relative wind at any time strikes the aeroplanes at an angle of incidence greater than the angle between the aeroplanes and the regulating vane 50, it also strikes the vane on the underside and forces it upward and rotates the valve member 45 to bring the inlet port 47 in alignment with the pipe 41, thus permitting the air from the storage tank 39 to pass into the enlarged portion 34 of the cylinder 32. The difference in the area of the piston 36 in the cylinder 34 and the piston 37 in the cylinder 35 is such that the air pressure in the cylinder 34 overcomes that in the cylinder 35 and moves both pistons longitudinally of the cylinder, thus actuating the crank arm 58 and rotating the drum 22 to adjust the elevator to such a position as to cause the forward end of the machine to move downwardly, thus decreasing the angle of incidence of the aeroplanes and also of

(Continued on page 142)

NEW WRIGHT MODEL, E.

The Wright Company has recently brought out a new type of machine for exhibition work called Model "E," which is the first product of this company equipped with only one propeller. This machine is a small single propeller biplane with the customary Wright controls, but differs considerably from previous products of this company in details of construction.

A 4-cyl. Wright, water-cooled motor, 30 H. P., is mounted alongside of the operator. The motor drives by chain the single central propeller, which is 7 feet in diameter. The tail spars supporting the rudders are spread wide apart so as to clear the propeller. The motor, seat, gasoline tank, radiator and propeller drive are all concentrated in one center section which is 4 feet 6 inches wide. On either side of this, by means of readily demountable fittings, are attached the wings, consisting of a cell of only two panels. The tail spars are likewise attached to the center section by demountable fittings, so that to take the machine down, it is only necessary to take off the wings on either side, and the tail at the rear, making the largest remaining dimension about 14 x 5 feet.

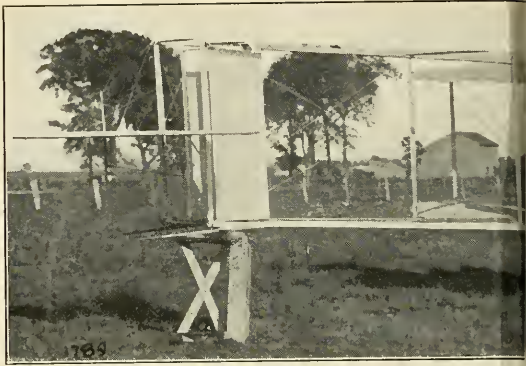
The wire fittings at the base of the strut on this new machine are a novel hook arrangement of great simplicity, making it possible to undo the wires merely by taking out the strut and loosening them up. As in previous joints on Wright machines the strut is held in place by a pin, and in this fitting the hook plate is the base plate of the strut. With the wires in the hooks, as soon as the strut is put into place the wires are locked in.

The landing chassis is exceedingly simple, resembling very much the landing chassis on the well-known Wright type "C." Two 24 x 4 inches wheel are mounted to the customary Wright skids.

A finished detail which is very effective is the manner in which the front blinkers are constructed of wood, quite rigidly fastened to the front of the skid, and doing away with much of the wire bracing formerly used.

The details of the control mechanism between the levers and rudders are quite different from other types of Wright aeroplanes, because of the necessity of clearing the propeller end of protecting the wires and cables at points in the vicinity of the propeller tips. The vertical rudder is 16 inches in depth, 3 feet 11 inches in height, of the usual biplane form, pivoted in a balanced position. The elevator is 12 feet wide by 2½ feet deep. The wings of this machine are covered with linen, treated with a new preparation which has been evolved after a long series of experiments at the Wright plant, and which gives an excellent finish to the cloth, without at the same time causing it to tighten too much. The finish given to the entire machine is typical of the fine work that is being turned out at the Dayton factory, and the neat appearance of the machine is most pleasing.

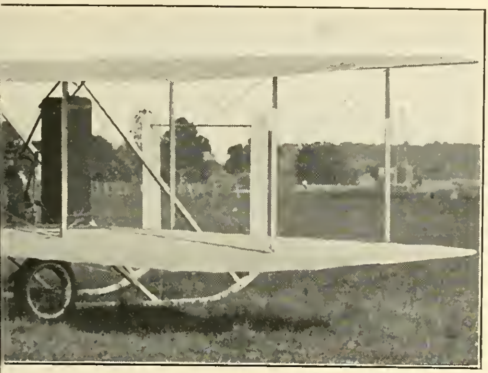
This machine has been designed particularly to meet the requirements of exhibition



flying, which calls for a light, handy machine, easily taken down and set together, occupying little space, and possessing plenty of climbing power and speed.

The span of Model "E" is 32 feet, the chord is 5 feet and the surface area approximately 316 sq. ft. The total weight ready for flight is only 730 pounds, which makes the machine all the easier to handle on and off cars, and in getting around from place to place.

During the past month on various occasions, Mr. Orville Wright has been flying this new machine at Simms Station, putting it through a long series of tests. The machine handles well in the air, is remarkably easy to land, and quick to start. A recent test of the time it requires to take down the machine



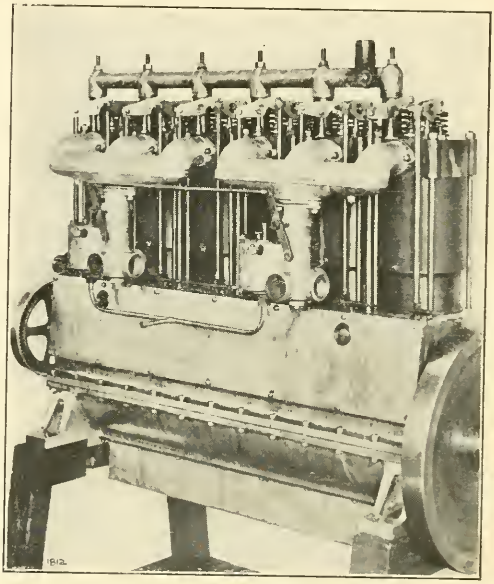
was made, and it took only 12 minutes after rolling it into the hangar at the conclusion of a flight to get it ready for shipment.

THE NEW WRIGHT SIX CYLINDER MOTOR

The new Wright six-cylinder motor, which is a development of the "six" first brought out at Dayton in 1911, has lately demonstrated very high efficiency, and excellent reliability. Harry N. Atwood, who is flying a Wright type hydro-aeroplane at Toledo is the first to use one of these new motors, and the unusual performances of his machine with the new equipment at Toledo have created a very sound enthusiasm. Though not trying for "stunt" records, but rather to demonstrate reliability and consistent good performance, Atwood has been carrying passengers, among them F. R. Coates, of Toledo Railway & Light Co.; Nathaniel Paige of the General Electric Company, and E. Lee Miller.

The new motor, 4⅜ inches by 4½ inches, as were the old ones, has been vastly improved in construction. The ports have been made larger, and both exhaust and intake are now mechanically operated. A novel feature which insures economical use of fuel and a safe and convenient means of throttling down is the fitting of Zenith carburetors.

As this is the type of motor to be used in the new type of Wright aeroboats, the demonstration of its excellence for water flying is of considerable significance. The weight of the motor complete is only 265 pounds, and it is said that the power developed is over 70,



on the Wright type machine. The A. L. A. M. rating would show the motor as developing but 46 H. P. It is common knowledge the A. L. A. M. rating is often exceeded, as in the case of the four-cylinder Wright, for instance.

Atwood consistently succeeded in making his Wright type machine with this new motor get off the water with a passenger in less than 15 seconds, climbing at nearly 300 feet a minute, and with an air speed that is easily varied from 42 to 56 miles an hour, a combination of greater safety, due to the low landing speed, with higher speed for cruising being obtained.

I wish to continue reading AERONAUTICS as I find it * * * far better than the rest. *V. D., Detroit.*

WRIGHT STABILITY PATENT

(*Continued from page 139*)

the vane 50 and causing the air currents to come in contact with the upper surface of the vane moves the same downwardly, as shown in dotted lines, Fig. 5 and reverses the valve member 45, moving the elevator in the opposite direction and again moving the aeroplanes to an increased angle of incidence. These operations are repeated successively until the movement of the vane 50 has been gradually reduced and the vane has but a very limited movement. By providing means for varying the angle of the vane to the aeroplane, there is provided means for varying the particular angle of incidence at which the aeroplane is automatically maintained, and thus the driver is enabled to direct the machine up or down without interrupting the working of the automatic controlling mechanism.

In Fig. 6 is shown a modified form of the controlling vane and arrangement for varying the angle of incidence. The operation will be apparent from the above details.

FOR LATERAL BALANCE

Any suitable means may be provided for warping the wing-ends and for compensating inequalities in the resistance of the right and left wings. This need not be gone into as readers are familiar with the Wright rudder and warp system.

For automatically operating the warping and rudder drums 65 and 74 of the Wright machine, is provided another air cylinder 78, pistons, etc., similar in construction to the cylinder 32, and connections which operate similarly to above. The arm 83 of the valve 82 is connected by means of a link 84 with one arm 85 of a bell crank lever which is pivotally connected to the frame of the machine at 86 and has its opposite arm 87 of considerably greater length than the arm 85 and extending downwardly to a point near the lower aeroplane, where it is provided with a suitable weight 88, thus forming a pendulum. Suitable stops 90 may be provided to regulate the motion of the pendulum. Normally the pendulum 87 is substantially vertical and maintains the valve 82 in its closed position, thus holding the piston in the cylinder 78 against movement. But should one end (side) of the machine rise the pendulum 87 will swing toward the lower side, operating the valve 82 to admit pressure at one end of the piston and move the same longitudinally of the cylinder. Thus through the medium of the connecting rod 79, and the disk 69, the drums 65 and 74 are rotated, thereby warping the wings and turning the vertical rudder 10. The first swing of the pendulum is such as to carry the rudder and aeroplanes beyong the neutral point, and consequently the pendulum will swing back and reverse the position of these parts. These operations are successively repeated until the pendulum 87 loses its movement and comes to rest. If it is desired to drive the machine in a circle, the drum 74, which controls the vertical rudder and which is held in place on the axle 66 by friction only, may be turned to a new position on the axle 66 and thus set the vertical rudder at an angle to its normal position, and with the parts thus reset, the automatic-controlling mechanism will operate then in exactly the same manner as when the machine is being driven forward in a straight line.

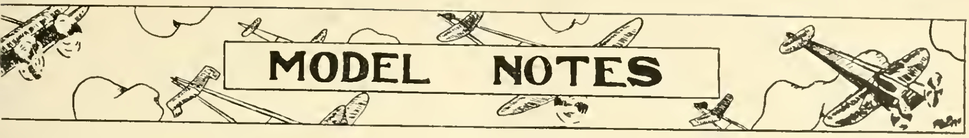
THOMAS FLYING BOAT

(*Continued from page 127.*)

of .0625 inches diameter runs through copper leaders with bell mouths where turns are made to the steering wheel, rotation of which operates the rudder.

The rear of the boat carries a fixed stabilizing surface of 10 sq. ft., triangular in shape. This is set at a slight angle, 2 degrees. To this stabilizer are hinged the two elevator flaps, which have a total of 16 sq. ft. of surface. Movement of the steering column fore and aft operates the elevators by .0625 inch wire cables, which enter the rear part of the boat and continue to the column out of sight in the interior of the hull. The rudder measures in rough outline 3 feet by 5 feet and has a total area of 9 sq. ft. A foot lever operates this by concealed wires in the hull.

The boat is 26 feet long, 2 feet deep, with a 3-foot beam. There are four watertight compartments, cross braced cedar bulkheads being used. Internal cross ribs spaced 8 inches apart, are used throughout the length of the boat. Cedar planking, in cross diagonal narrow strips, is used in building the hull. This is nailed on the framework with wire brads. Linen and white lead is placed between the two layers of planking. The hull is entirely covered with sheet steel, painted gray. The cockpit is formed in the hull itself. The spray shield, of Goodyear fabric, is detachable. Side doors permit easy entrance. The boat can carry 750 pounds in excess of its own weight. The boat weighs, empty 40[illegible] pounds, and the total weight of the complete machine, empty, is 1,200 pounds. The power plant is a 65 H. P. 6-cyl. American-built engine. It drives direct a propeller, 8 feet diameter by 5 feet pitch.



THE FUNK TRACTOR

By Harry Schultz, Model Editor

The model shown in the accompanying awing was constructed by Rudie Funk, of e Long Island Model Aero Club. Although has not been tested very extensively up to e present time, it has many good qualities d no doubt will prove itself a prize winner.

The fuselage is constructed of spruce $\frac{5}{16}$ $\frac{3}{16}$ of an inch and is 36 inches long. The selage is 3 inches wide at the center and braced by an "X" bracing of bamboo as own. It is brought together and glued at front and rear. At the front where the main beams are joined together, is athed the bearing block and at the rear is ook for the reception of the rubber motor.

The main plane is 32 inches in span with a rd at the center of 6 inches. The edges l ribs of the plane are constructed of $\frac{1}{16}$ h flat steel wire, and the main beam is of ite pine ¼ by ⅛ of an inch in thickness l is rounded off to a stream line form. e sketch shows the construction of the ne.

The tail plane is constructed with its edges of wire and the two ribs are double ribs of bamboo. The planes are covered with silk fibre paper and coated with Ambroid varnish, the main plane being covered on the upper side and the tail double surfaced.

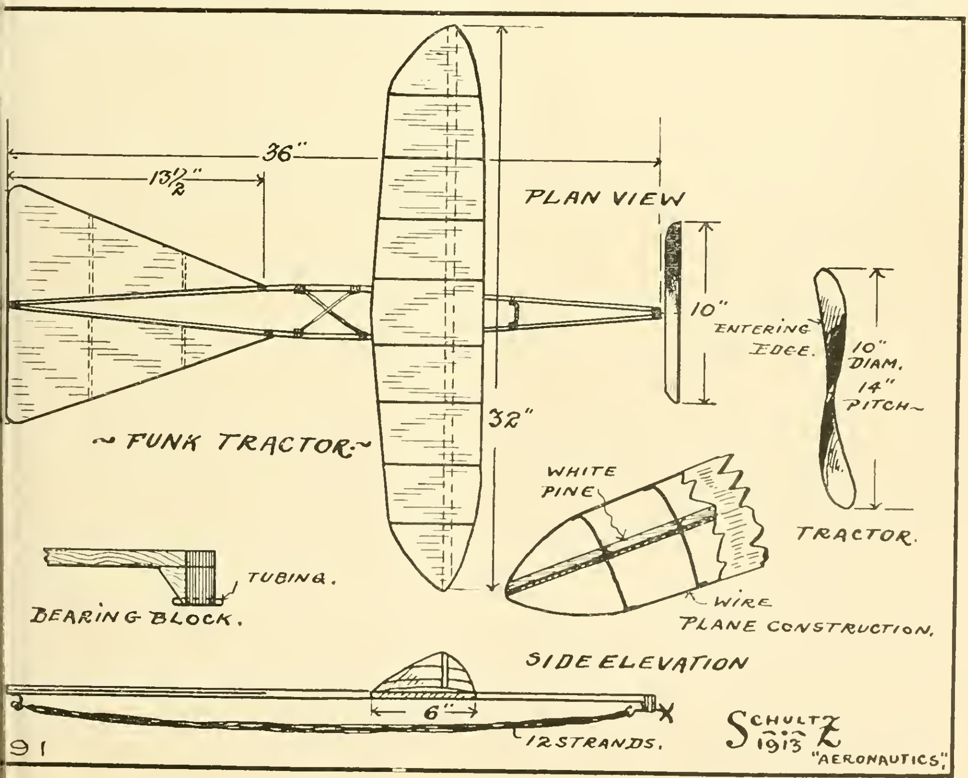
The propeller is carved from a block of white pine and is 10 inches in diameter with a pitch of about 14 inches. The concave edge is the entering edge. It is driven by 12 strands of ⅛ inch flat rubber.

MODEL FLYING AND ITS PURPOSES

By the Model Editor

The writer has been asked a number of times the following questions: "What is the purpose of flying models; is it merely a sport for boys, or is there any knowledge to be gained that would aid in the construction of man-carrying or full-sized machines?"

Model flying can be considered in different ways. Some of the model flyers indulge in it for the purpose of whiling away their time while others indulge in it for the purpose of



learning whatever can be learnt, and which would aid them in the construction of man-man-carrying or full-sized machines?"

If the new ideas of would-be inventors were first tried out by means of the flying model there would be thousands of dollars saved yearly and less "flying tenement houses" on the scene. When these "inventors" are spoken to on the subject, they no doubt will state that their ideas were embodied in a model, said model being in the form of a glider, the same being cast from a balloon or high elevation and because of the fact that the glider descended safely to earth they consider themselves to be the possessor of a remarkable "invention." This is merely a half-way method of testing out a new idea. Let the invention be embodied in a model equipped with power, let the model be adjusted and placed on the ground. If it will rise and show good stability and good qualities of flight, it is then time to think of embodying the same in a full sized machine. If this is done much of this wanton waste of money will be avoided.

The model aeroplane of today has reached the stage of being practically perfect. It will fly in winds that will keep a man carrying machine on the ground. When equipped with skids it will rise from the ground, show perfect stability, soar away for over fifteen hundred feet and alight perfectly at the end of a flight. When the model is equipped with pontoons or floats it will skim the water, rise gracefully from the surface and fly off. Anything that can be done by a man-carrying machine can be duplicated by its miniature edition, the model aeroplane. Scarcely had the first hydroaeroplane risen from the water when this feat was duplicated in model form. One young enthusiast has attached a parachute dropping device to his model (see AERONAUTICS, Aug., 1913), which enables the parachute to be dropped at any predetermined time.

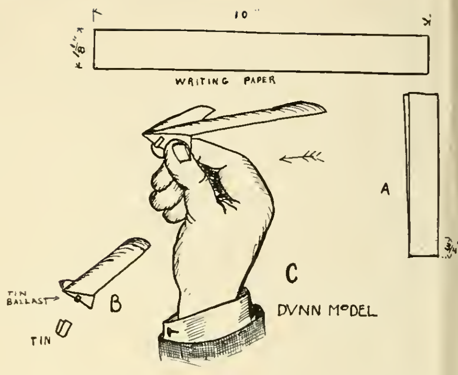
The canard type machine such as the Valkyrie, Boland, Voisin, and Bleriot, was known to the model flyers years before the above machines were put upon the market, and, in fact, is the type of model that holds all records today.

In conclusion, therefore, I desire to state that those who take up model flying as a sport, will not find a more exhilarating sport, and those who take it up for the purpose of gaining knowledge, will find that there is something new to learn every minute, and they will never regret the time spent.

DUNNE MODEL

The stability of a Dunne type aeroplane may be readily demonstrated with an easily made paper model.

A strip of fairly stiff writing paper 1⅛ inches by 10 inches, doubled up, then folded along dotted line, as shown in sketch "A," is the glider. A slight bend should be given the



wings; slight at the center and near the forward edge to more convex towards the ends "B." A piece of tin about ¼ inch by 1 incl is bent so as to clamp on the keel. This ma be moved back or forward till the machin flies best. Best results are gotten by launch ing with a slight forward movement, as i "C." E. J. BACHMANN, Jr.

PROGRESS IN PROPELLERS

The progress of aerodynamics has been ii timately associated with that of the perfec ing of the motors as well as with the increa: of knowledge as to the action of air upon su faces in movement. As to the dynamics (the air, considered with regard to aviatio we may distinguish between the theoretic and experimental results. Among the form there is the important study of Soreau on tl propeller, of which he spoke at a conferen last year of the Société des Ingénieurs civi Soreau remarked that there are two schoc devoted to the theory of the screw. One co siders the elements of the screw itself, wit out taking into account the movements of t fluid molecules; the other school, better coi prehending the flow of liquids, finally reach an avowal of their powerlessness and becai strengthened in that avowal as the study the physical phenomena showed increasi complexity. Soreau says that, after havi sided with the latter school at first, he nc believes that it is possible to analyze the a tion of the blades of the screw, with t double reservation that the action takes pla in a limited space and that we be content w approximate laws. These laws lead to fo mulæ no longer wholly empirical, because, thus developed, they show the parts play by the various dimensions, indicating th order of magnitude and relative influen Starting thence, the author has commen to analyze, guided by preconceived ideas, better experiments on the subject and hoj to get some general results. For some ti analagous ideas have guided the Naval En neer Doyère in the study of marine scre for which investigations the Académie (Sciences, in 1911, bestowed a part of the V: lant prize. L. LECORNU

Model Flying Machines

A thoroughly modern hand book describing and illustrating in detail the principles of flight and giving full directions for building seven types of model machines. Seventy pages, 56 original illustrations, and 9 full page detail plates. Paper covers only.

25 cents per copy, postpaid

COLE & MORGAN, Pub., Newark, N. J.

Now Ready

The Airman's Vade-Mecum

"NO. 1," METEOROLOGY

By Colonel H. E. Rawson, C. B.

(Vice-President Royal Meteorological Society; Council Aeronautical Society)

CONTENTS: Introduction and 5 Chapters on Temperature, Pressure, Wind, and Precipitation. Weather Forecasting. Index.

(*Illustrated*)

Price 40 Cents Net Post Free

"AERONAUTICS," 3, London Wall Buildings, London Wall, London, E. C.

"Stays Tight As a Drum"

Goodyear Aeroplane Fabric, now used by practically all aeroplane makers, is famous for its STAY-TIGHT properties. Made of highest grade long fibre cotton. So thoroughly impregnated with the Goodyear compound that it is MOISTURE-PROOF and NON-ROT.

GOODYEAR AKRON, OHIO

AEROPLANE FABRIC

won't shrink or stretch. Great for "Hydros" as well as "Aeros," because waterproof. Send a postal today for all the facts about Goodyear Aeroplane Accessories, Fabric, Tires and Springs—(also Balloons).

THE GOODYEAR TIRE & RUBBER CO.

AKRON, OHIO

Toronto, Can. London, Eng. Mexico City, Mex.

Branches and Agencies in 103 Principal Cities

Write Us on Anything You Want in Rubber

THE WRIGHT COMPANY

ARE NOW PREPARED TO DELIVER

The New Six-Cylinder 60-H.P. Wright Motor

MODEL 6-60

EQUIPPED WITH MECHANICAL VALVES AND DOUBLE CARBURETORS: BORE $4\frac{3}{8}$", STROKE $4\frac{1}{2}$"

This Motor can be throttled down to 700 r.p.m. without in any way affecting the smoothness of running, and with its full speed of well over 1500 r.p.m. a flexibility is obtained that compares favorably with the best types of motor car engines.

The structural details of this Motor are exceedingly simple and reliable, and its performances recently both on land and in water flying, show it to be a worthy successor of the Wright Four-Cylinder, 40.

THE WRIGHT COMPANY DAYTON, OHIO

New York Office
11 PINE STREET

JUST A FEW FOREIGN FLIGHTS AS AN EXAMPLE OF WHAT MIGHT BE TRIED IN THIS COUNTRY

Sept. 4—Gsell (waterplane) flies with three passengers, 3 hours 11 minutes 4 seconds, a new world record.

Sept. 5-7—Friedrich (Etrich) flies, Berlin to Paris, with a passenger; 3 intermediate stops; 950 kils.

Sept. 9—Reichelt and mechanic (Harlan) fly from Berlin to Paris, making 5 intermediate stops; 950 kils.

Sept. 13—Friedrich flies to London, with Etrich as passenger.

Sept. 13—A Seguin (H. Farman) flies from Paris to Berlin, non-stop, in 10 hours 51 minutes.

Sept. 13—Guillaux (Clement Bayard monoplane, Clerget motor) flies from Paris to Savigny-sur-Braye, 190 kils., with a passenger.

Sept. 14—Chevillard flies Copenhagen, Denmark, to Gottenberg, Sweden, with passenger, 260 kils., non-stop.

Sept. 15—Figueroa (Bleriot) flies from Antofagasta to La Pampa, Chile, a distance of 210 miles.

Sept. 15—Stoeffler (Aviatik) flies from Mulhausen, Germany, to Plotsk, near Warsaw—Poland, 1,200 kils., during the night in 8 hours, 6 minutes.

Sept. 16—Flying daily at Etampes since Aug. 25, an average of 694 kilometres, Fourny covered a total of 15,990.8 kilometres in 23 days (Maurice Farman biplane, Renault motor), in competition for the Michelin prize for pilot who covers greatest distance in any number of days, flying at least 50 kils. a day. This in miles, is 9,929.54, representing a straight flight along the 40th parallel from Peking to Cape Breton, Nova Scotia.

Sept. 16—Emile Vedrines (Ponnier monoplane, 100 H. P., see AERONAUTICS, p. 101, Sept.) attained 161 M. P. H. cross-country with the wind.

Sept. 16—Stievator flies from Freiburg to Konigsburg, Germany, 700 miles, with passenger; two stops.

Sept. 16—Guillaux returns with passenger in 50 minutes from Savigny, at a speed of 210 K. P. H., with a strong wind behind.

Sept. 16—Friedrich and Etrich leave Hendon, and arrived back in Berlin on Sept. 20, made three intermediate stops.

Sept. 22—Noel (White) carries 7 passengers for 17 minutes 25 2/5 seconds, a world record.

Sept. 23—Garros flies non-stop from St. Raphael, France, to Bizerta, Tunis, crossing the Mediterranean Sea, a distance of 560 miles, the longest non-stop over-water flight yet made. It represents a flight from Philadelphia to Charleston, S. C., in distance. He was 7 hours 53 minutes in the air. (Morane monoplane, 60 Gnome).

Sept. 24—Moreau in "aerostable" machine flies 20 kilometre circuit without touching lateral controls in wind not less than 5 kils. per second. He used rudder and elevator entirely.

Sept. 24—Thuelin (Farman) flies across Baltic Sea from Landskroma, Sweden, to Stralsmund, Germany, a distance of 180 kils. non stop.

Sept. 24—Oct. 2—Chevillard (H. Farman) with passenger flies Stockholm to Gefle, Sweden, 180 kils.; to Falon, 95 kils.; Vasteras, 149 kils.; Upsala, 80 kils.; to Nordkoeping, Sweden, 300 kils.; to Carlstad, to Orekra, 300 kils.; touring Sweden.

Sept. 26—Langer flies 9 hours 1 minute 57 seconds, making German duration record.

Sept. 26—Victor Stoeffler flies from Warsaw to Berlin, 550 kils., non-stop, 4 hours 2 minutes.

Sept. 29—St. Steffen flies from Berlin to Brussels with one intermediate stop. Distance, 420 miles.

Oct. 1—Sablatnig took 3 passengers to a height of 2,800 m., at Berlin; 4 to 2,080 m., and 5 passengers to 1,000 m.

Oct. 2—L. Noel (White) took up 10 passengers; reached 600 feet height.

Oct. 3—Noel flies at Hendon with 9 passengers for 20 mintues, making a new world record.

Oct. 3—Sablatnig took up five to 1,015 m.

Oct. 5—Roland Garros (Morane—160 Gnome) makes new hydroaeroplane speed record in Lake Como race—127,72 kils. per hour.

Oct. 10—Victor Stoeffler (Aviatik) flies from Warsaw, Russia, to Berlin, Germany, non-stop, in 4 hours 2 minutes. Distance, 341 miles.

Oct. 12—Reiterer (Etrich) with passenger, flies Berlin-Copenhagen, non-stop, 229 miles.

Oct. 13—Seguin (H. Farman) flies from Paris to Bordeaux, and back, non-stop, 1,040 kils., in 13 hours 5 minutes, beating the world's distance and duration record for non-stop flying.

Oct. 14—Stoeffler (Albatross) makes longest flight in one day, 1,376 miles, in 22 hours 47 minutes, actual flying time, from Berlin to Posen and return, Berlin to Mulhausen, and to and from Mulhausen to Darmstadt. Total elapsed time 24 hours 36 minutes. This was in the attempt to beat the record of Brindejonc des Moulinais, from Paris to Warsaw, 1,382 kils., who beat Guillaux, who flew from Biarritz to Brockel, Germany, 1,340 kils.; both flights in 24 hours elapsed time. Among other attempts made for the Pommery Cup were Letort (Paris—Dantzig), 1,350 kils; Janoir (Etampes—Berlin), 1,000 kils.; Gilbert (Paris—Caceres), 1,300 kils.; Guillaux (Paris-Bermillo), 1,160 kils.; Seguin (Biarritz—Breme), 1,350 kils.

Oct. 15—Thelen (Albatross) flies 867 miles with passenger in one day, making three stops.

Oct. 16—Garros (Morane—Saulnier) flies from Marseilles to Paris, a distance of 836 kils., non-stop.

Receiving orders to join the maneuvers, Lieut. Collard recently flew from Epanile to Agen, his destination, a distance of 600 kils. He encountered very rough weather, especially in the neighborhood of Bordeaux, but accomplished the trip without a hitch.

Mr. John D. Cooper, the Curtiss aviator, has completed the demonstration of a recent shipment of Curtiss water-flying machines for the Imperial Russian Navy. The trials were perfectly successful, all the machines being approved and accepted by the government within two weeks after their arrival there.

Curtiss flying-boats and hydroaeroplanes now form the entire aerial equipment of the naval aviation corps, some sixteen machines having been accepted during the past year, with others under course of construction in America, and arrangements about completed for the establishment of a branch factory in St. Petersburg. Extensive experiments were made during the year with hydroaeroplanes turned out by leading European builders, but none of these proved as satisfactory as the American machines.

EDITORIAL

FOR AN AERONAUTICAL CENTER

It is generally admitted in inner circles, and, fortunately, the general public is aware of e fact, that there is a "slump" in aero-utics.

Ballooning is not quite as popular as it s been but one could scarcely assign a defi-e cause for the decline. The races here s coming year will have a great beneficial ect and we anticipate increased activity. llooning is comparatively inexpensive. The st cost is less than that of an aeroplane; rties can make trips at moderate expense d there is no shed to rent and little repairs.

The dirigible is coming back and we are oking hopefully to the time when we will two-man sporting ships sailing about, and ssibly a big passenger cruiser or two.

Certainly we have less cause to worry over prospects of the ever-delightful balloon- sport than over the outlook for aviation.

Without a doubt it is probable that the aths in aviation so conscientiously chron-ed and totalled in the daily newspapers ve scared off a great many, who have no owledge of the "other side."

That aeroplanes have been used almost en-ely for exhibition work and not for sport one has deterred the so-called "sporting ss" from taking up aviation with avidity.

We have looked to the flying-boat to bring out a reversal of public sentiment and to duce sportsmen to take up over-water avia-n. With regret one must admit the flying-at has not wrought the change expected—ssibly it will in time.

Perhaps a reduction in the selling price would ork wonders. The automobile has ceased be a rich man's toy—it is the necessity of e man of smaller means. Let the aeroplane, nd or water, come within the limit of the cketbook of the bulk of the citizens.

We do not want to assume to prescribe for iation but from the following thoughts mething may be worked out.

With the novelty of the aeroplane worn f, spectators at the flying fields are now w and far between. They are no longer ntent to sit around for hours waiting for chance hop or two. Flying fields are gen-ally too far from city limits to make quick cess feasible and this disadvantage militates ainst popularization.

Assuming that New York is the hub of a eat wheel, and that it has peculiar advan-ges for the furthering of any industry and ort, let us make it a great aeronautical cen-r. Select the best available field, one as ar the city as possible and with the quick-t means of transportation. Let every manufacturer whose future is dependent on activity in aviation lend his aid to making this field the scene of his work. Locate the factories at this field, if possible. At least, here conduct the flying schools.

We find Curtiss training military officers and citizens at San Diego, at Hammondsport; Burgess, at Marblehead; Benoist, at St. Louis; Thomas at Bath; Wright, at Dayton; Moisant and Sloane at Hempstead, and so on; one finds fields scattered all over the country with a machine or two at each. There are individuals conducting schools or experiments at scores of other places. There is little interest created at any one of these individual grounds. No benefit is derived from the public's witnessing the desultory flights at these scattered grounds.

Imagine all these military, naval and civil schools, and some factories, propeller workshops, repair shops, individual exhibition or sporting flyers, making headquarters at one great center! There would certainly be no greater expense conducting schools at one place than another.

With practically all the interests grouped in one place, there would be flying constantly going on. The general public on which we want to draw for recruits will have their enthusiasm returned to them, they will be going to this center to see the flying. They will be sure of seeing machines in the air at any time of any day. They will be making passenger flights, taking lessons, buying machines.

Entrance fees could be charged on every day. Weekly meets could be held at no expense. The students and instructors are flying anyway. Let them make the weekly flights competitive and afford enjoyment for a crowd. The income from attendance could be distributed pro rata among the men flying, among the manufacturers and schools. Soon we would see people in line for passenger flights.

The public would be paying for the privilege of increasing its own interest in flying.

The doings at this great field would be chronicled in the newspapers—we see nothing in the papers about the flights now at our present scattered fields.

A centering of interests like this would absolutely create wide attention. There is no good to result from complaining of lack of interest and doing nothing to make interest. Let the manufacturers do something themselves to help themselves.

A national center such as suggested should be conducted by the manufacturers and school

concerns—by those whose interests are most affected—free from any club alliance.

One could add pages of suggestions for making such a center a wonderful missionary movement, a manufacturing and industrial center, a selling institution, profitable from the start.

GOVERNMENT PROGRESS IN AERONAUTICS

Colonel Samuel Reber is now at the head of the Aeronautical Division of the Signal Corps which has been practically reorganized under the present Chief Signal Officer. Heretofore, aeronautical work has been done under the direction of Major Squires and Major Russel, who succeeded the former, but these officers were hampered by other duties in the Signal Office. Good work it has been with the limited funds placed at command by a penurious or short-sighted Congress. Many remember the whole-souled endeavors of General Allen, now retired, and appreciate the labors of his successors, General Scriven and Major Russel.

Acquaintances of Colonel Reber know him for a man with directness of purpose and an adequate knowledge of aeronautical needs. Things will move along just as fast as Congress will permit by provision. The recent bill before Congress to take aeronautics out of the hands of the Signal Corps and make it a separate arm has not yet been passed, praise be!

Captain Chambers, head of aeronautics in the navy, is big-hearted, informed and competent in aeronautical matters. He knows the needs of the navy in aeronautics, is conversant with all that has been done in foreign navies in aeronautics, and is endeavoring to accomplish still greater things than those which have in the past been enumerated in the press.

The ways, routine and red tape, of army and navy secretaries and Congress, are inexplicable to the layman and because every ship of our navy afloat is not equipped with a complement of aeroplanes and aviators is no reason to assume that we are in the ruck on this particular point. We haven't heard of any foreign armored ships with air scouts in actual service and it may be that before another year rolls around we will be fairly well fitted to hold our own.

Somehow or other we get the idea that Europe is so far ahead of us that we'll never catch up. If we had the public temperament here and an open-minded Congress we might do a shade better.

NOT PREDICTED—MERELY EXPECTED

Mr. McCormick has abandoned his $50,000 experiment station at Cicero flying field.

* * *

Failure of the models in which Mr. McCormick has been interested is said to be the cause of the closing of the experiment station. On one design, known as the umbrella plan, because of its shape, he is said to have spent $25,000.—*Chicago Journal.*

Those who disagreed so forcibly with our editorial on the ways and ways of spending in aeronautics, may now find their opinions changed.

WILD BILL EXPAINS

In days gone by the expression was: "Lo, the poor Indian." Now, however, it is the more up-to-the minute: "Lo, the poor aviator!"

Eugene Heth, better known as "Wild Bill," spent a few hours in Memphis yesterday. Incidentally, Heth says that aviation is fast becoming so commonplace that before long the birdmen will find that the remuneration is not sufficient for the risk.

"There are too many aviators, and the country is flooded with machines, good and bad," explained Heth. "Then another thing that is working against the real artists in the game is that a crowd of amateurs are glad to make contracts for a few hundreds a day.—*Memphis Appeal.*

BOOKS RECEIVED

THE AIRMAN, by Captain C. Mellor, R. E., 12mo., cloth, 123 pp., illustrated. Published at $1.00 postage 10 cents, by the John Lane Co., 120 W. 32nd St., New York.

This book contains the experiences of a young Englishman, who in three months was to learn to fly and then present his certificate to the War Office. He elected to try the school at Etampes, France, and the Maurice Farman biplane was the machine he chose. He graphically describes his school, his first flight, his visit to the salon to see the exhibition of aerial locomoton, his first flight in a monoplane, etc. He gives many useful notes for the prospective pupil, and his experiences will be invaluable to every would be pilot of the air.

AERONAUTICS

Published Monthly by Aeronautics Press

122 E. 25TH ST., NEW YORK
CABLE: AERONAUTIC, NEW YORK
'PHONE, 9122 MADISON SQ.

ERNEST L. JONES, Pres't — — THOMAS C. WATKINS, Treas'r-Sec
ERNEST L. JONES, Editor — M. B. SELLERS, Technical Editor
HARRY SCHULTZ, Model Editor

SUBSCRIPTION RATES
UNITED STATES, $3.00 FOREIGN, $3.5

No. 74 OCTOBER, 1913 Vol. XIII, No.

Entered as second-class matter September 22, 1908, at the Postoffice, New York, under the Act of March 3, 1879.

¶ AERONAUTICS is issued on the 30th of each Month. All copy must be received by the 20th Advertising pages close on the 25th.

¶ Make all checks or money orders free of exchange and payable to AERONAUTICS. Do not sen currency. No foreign stamps accepted.

To the Readers of this Journal:

Please accept my thanks for the hearty response to my letter of last issue. It was a surprise to really find such a heavy response.

Now, won't those who have not yet responded make the appeal 100 per cent. fulfilled by replying at once? The encouragement given by those who did co-operate is great. With replies reaching the hundred per cent. mark you'll create enough dynamic energy to last a long while.

This magazine is published for the benefit of those who find profit in it. It is neither a money-making proposition or purely a philanthropy.

That some profit by its publication I know, for they pay their subscriptions. That others profit by its publication I know, for they say so. Now there are still some who speak not; neither do they pay.

These do I address. There are but three propositions. Pay, promise to pay, or say frankly you don't want the magazine.

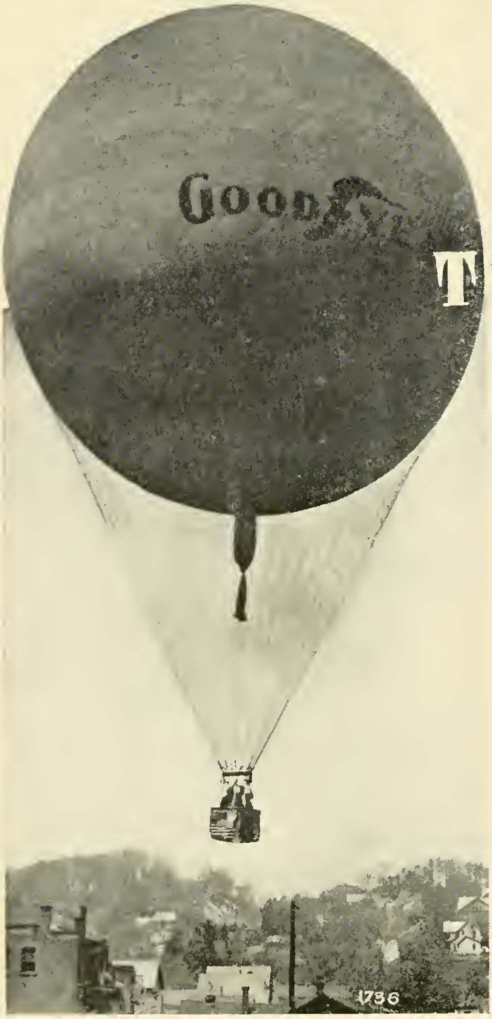
I am doing my best to furnish the best there is. If you find a better magazine, subscribe to it; and then tell me you've found it. That will help me, perhaps. If you object to certain features, tell me.

I can't speak to you all with sounding words. I must ask you to read what I write. If you don't want the magazine, say so. If you have found a better, tell me! If you do want it, may I have your renewal order or your check?

Thank you in advance.

E. L. Jones

NEWS IN GENERAL



AMERICAN WINS BALLOON RACE

Goodyear and Honeywell

THE international balloon race was won for Uncle Sam for the fourth time in the eight years of the existence of this event by Ralph H. Upson and R. A. D. Preston in the balloon "Goodyear," with H. E. Honeywell and J. H. Wade in the "Uncle Sam" second.

The race started from Paris, October 12th. There were 18 balloons in the contest. Upson landed at Bempton, England, on the North Sea, within 200 yards of the cliffs. Honeywell landed in France near Brest. The distance covered by the "Goodyear" i: about 400 miles. No new records were made.

This achievement was only accomplished througl the scientific handling of the balloon by these youn aeronauts. They were competing with men of fa greater experience, and under foreign conditions tha from the beginning were considered a big handicap

Mr. Upson has made a study of ballooning an was well informed on the various currents of ai that were to be encountered along the coast. Up son and Preston have the honor of being the onl two contestants who sailed their balloon outside c France. When the balloon "Goodyear" headed fc the ocean, Upson was familiar enough with the pr vailing air current to know that counter-winds woul be met that were sure to blow him back over th continent. This proved to be the case. They crosse the English Channel and traveled miles over tl Atlantic, however, before these winds were e countered.

Their scientific study of ballooning and the g tightness of the fabric were the main reasons f enabling them to win.

The "Goodyear" is the same balloon that won tl National Championship Balloon Race at Kansas Cit July 4th, 1913. It was also in the national race 1912.

ASCENSIONS

Oct. 10—Wm. Assmann and Joseph O'Reilly in t "Mill. Pop. Club" from San Antonio to Russellvill Mo., a distance of about 725 miles in 22 hours 40 mi utes in endeavor to beat Lahm Cup record.

Oct. 1—R. H. Upson and R. A. D. Preston in t "Goodyear" from Paris on a trial trip, landing at Poi a distance of 78 miles.

NEWS BREVITIES IN U. S. A.

Sept. 22—"Ed" Steele in a hydroaeroplane flew over the Pacific Ocean from North Bend, Ore., to Florence, with one stop at Gardiner, a distance of 40 miles. Finish is intended to be at Yaquina.

George Dyott has again gone to England.

Oct. 4-5—William Thaw and Steven McGordon (Curtiss flying boat) flew from Newport to New Haven, a distance of 94⅜ miles, in 93 minutes. The following day Thaw and MacGordon continued their flight, 84½ miles more, and landed near The Aeronautical Society's grounds at Oakwood Heights, S. I., after one intervening stop at Hunters Point.

The steamship distances, Oakwood to Newport, are given above.

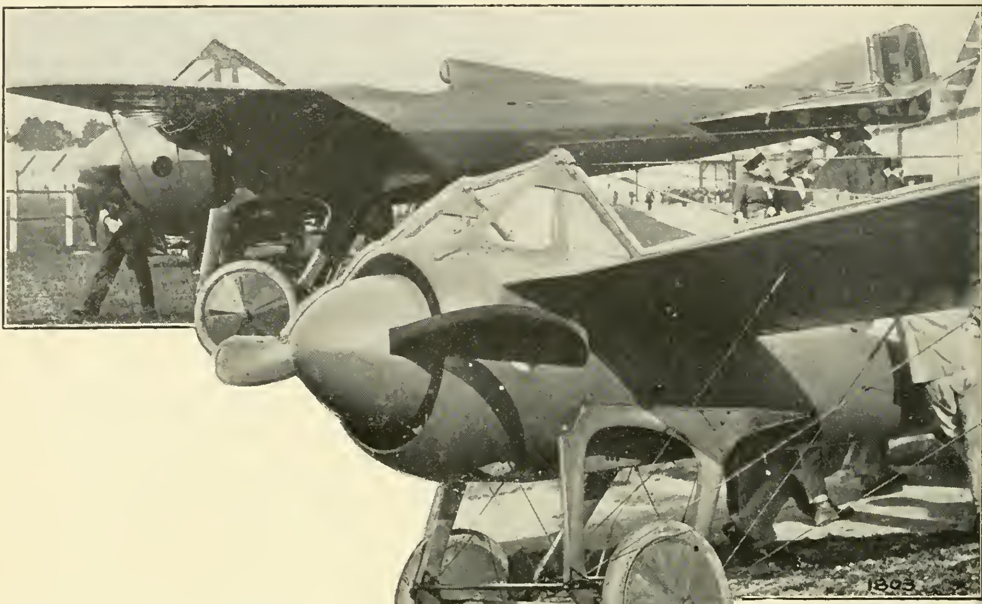
Oct. 7—Beckwith Havens and J. B. R. Ver Planck (Curtiss flying-boat) flew from Albany to near Oakwood Heights, S. I., with a stop at Chelsea, N. Y., a distance of 148.5 miles via route. The total elapsed time was 2 hours 45 minutes. The flying weight was approximately 2,000 pounds. The first stage was 81 miles.

I have always found your magazine invaluable. *R. P., Williamstown, Mass.*

Oct. 16—Havens and Verplanck flew from Oa wood Heights, S. I., back to Fishkill, arriving the the 18th, a distance of 64 miles.

Oct. 22—Raymond V. Morris in Gerald Hanle Curtiss flying-boat, with a passenger, made the lo est flight made around Providence this season. covered, according to the Government charts, a c tance of 145 miles in 125 minutes. Bristol, F River and other points on Narragansett Bay w flown over. Sixteen gallons of gasoline were c sumed. Morris's passenger was William Batcher, motor expert from the Curtiss factory. During three months the Hanley flying-boat has been in cc mission it has flown approximately 6,500 miles at average speed of sixty miles per hour.

Oct. 8—W. C. Robinson, carrying copies of a n newspaper, flew from Montreal to Ottawa, cover about 109 miles in 2 hours 55 minutes actual fly time. He made five stops on the way, of which th were scheduled for the delivering of copies of paper.



The International Race Winning Dep.

INTERNATIONAL 'PLANE RACE

Prevost won for France the 200 kilometre Gordon Bennett "international" aeroplane race, held Sept. 29th, Rheims, France, in a 20-foot span Dep with flat wings, 160 Gnome motor, making new world records as follows:

10 kils. (6.2 m.)	2 min. 56 3/5 sec.
20 kils. (12.4 m.)	5 min. 54 1/5 sec.
30 kils. (18.6 m.)	8 min. 52 1/5 sec.
40 kil. (24.8 m.)	11 min. 50 1/5 sec.
50 kils. (31 m.)	14 min. 48 1/5 sec.
100 kils. (62 m.)	29 min. 40 sec.
150 kils. (93 m.)	44 min. 38 sec.
200 kils. (124 m.)	59 min. 45 3/5 sec.
¼ hour	50 kils.
½ hour	100 kils.
1 hour	200 kils.
Greatest speed	203.85 K.P.H.

His fastest lap was at the rate of 126.9 miles an hour and his average for the entire distance was 124.69 miles.

Emile Vedrines (Ponnier—160 Gnome) was second in 1 hour 51.4 seconds.

Gilbert (Dep—160 Le Rhone), third, in 1 hour 2 minutes 55.4 seconds.

Crombez (Dep—160 Gnome) was the only foreign contestant, and his time was 1 hour 9 minutes 52 seconds.

America was not represented by Weymann, as expected. He claims he was named by the F. A. I.'s representative in this country and advised by the club that a syndicate was being formed by Norman Prince to buy a 200 H. P. Dep, the club declining any responsibility. After many cables the Dep was not forthcoming and, according to interviews with Weymann, he was never able to get a satisfactory explanation of Mr. Prince's intentions. I can only imagine that the whole business was a big bluff. I have telegraphed to him saying so.

"Now, without a machine it is, of course, impossible for me to compete in the race, much to my regret. I understand that another American pilot, named Kantner, was also bluffed in the same way. Who is Mr. Prince, I should like to know?"

Prince denies he's a "bluffer" and replies:

"I countermanded the order for a Deperdussin monoplane because Mr. Weymann stayed at Gynard for one month after the Paris-Deauville race without answering cables sent by me instead of being in Paris attending to the delivery of the machine, or at Rheims practising for the races.

"In other words, he failed to stay on the job and I cancelled the order for the machine."

Harold Kantner was first named by Prince and Kantner went abroad. When Weymann seemed available, Prince decided Weymann offered a better chance for winning and offered the machine to him.

LUCKEY WINS FIRST AIR DERBY

Under the auspices of The Aeronautical Society, for prizes aggregating $2,250, offered by the *New York Times,* five aviators covered a 51 mile course around Manhattan Island in a 42 mile wind on October 13th in a race held to celebrate the tenth anniversary of man's first power flight, that of Wilbur and Orville Wright, December 17, 1903. Out of those who had entered the celebration flights and the race, the following five actually started on schedule time, in a wind measured by the Weather Bureau at 36 to 42 miles an hour, from the field of the Society at Oakwood Heights, across Staten Island and the Bay, up the East River, over the Harlem and back down the Hudson to the field: William S. Luckey (Curtiss, 100 H. P.), Charles F. Niles (Curtiss, 100 H. P.), C. Murvin Wood (Moisant monoplane, 50 Gnome), J. Guy Gilpatric (Sloane Monoplane, 50 Gnome), Tony Jannus (Benoist Tractor, 75 Roberts); and they finished in the order named. The two monoplanes were blown wide of the course and the old passenger carrying Benoist was no speed match for the Curtiss machines. Not an incident marred the race and each engine drove along without skip. Luckey found his intake pipes freezing but was able to knock off the ice and keep going. Coming down the Hudson with the wind at the back, a speed of 75 miles an hour was attained by him. He used a propeller from a flying-boat which gave a standing thrust of 650 pounds.

Wood made the fastest time from Spuyten Duyvil to Oakwood Heights, covering the 24 miles in 14 minutes 19 seconds, a speed of 100.7 M. P. H. He took 58 minutes 19 seconds to get to Spuyten Duyvil. Luckey and Niles both beat the monoplanes going up the East River against the wind in speed but Wood beat both in speed on the return. Figures seem to show that Niles made 90 miles an hour on the return leg, evidently getting a better breeze, or else observers figures were not taken accurately, at Spuyten Duyvil.

Exhibition flights had been arranged to take place during the afternoon but the high wind kept the other machines on the ground. Burnside with his Thomas, Daimler motor, was not able to set up in time and another tractor was disqualified by reason of alleged poor condition. Other machines present were Ray Benedict (Gressier, 60 Anzani), Ruth Law (Wright 30), Allen S. Adams (Sloane-Dep, 60 Anzani).

Luckey received first prize of $1,000, Niles the second, $750; and Wood the third, $500.

ACCIDENT TO WALB.

Capt. Walb started from Hempstead in a Schneider biplane but fell in the Bay nearing the shore of Staten Island. He was rescued by a boat and his machine towed ashore.

FLY FROM HEMPSTEAD.

Wood flew from the Moisant sheds at Hempstead to Oakwood Heights for the race.

AERO CLUB PLACES NILES FIRST.

The race was supposed to be open to un-"licensed" aviators as well as licensed pilots. Luckey was an unlicensed man. Every aviator in the race went in with the knowledge that the race was open to anyone and each expressed himself in public as caring nothing one way or the other—whether he had a license or not, however, sanction from the Aero Club of America was asked for by President Twombly of the Society and granted by the Club. At a meeting of the contest committee of the Club, held after the race, it was decided that Niles was officially the winner, moving up the succeeding contestants a place. As the money had already been paid to the winners by the *Times* this action on the part of the Club is ridiculous. It is the rule to punish licensed pilots for taking part in unsanctioned contests by suspending them, barring them from any sanctioned contests and failing to record their exploits as "official." The club states that the contestants in the Air Derby asked the judges immediately before the race if it was sanctioned and received an answer in the affirmative. The club also states that the race was sanctioned by it and that, therefore, no punishment could fall on the contestants, save Luckey, who had no license. The Aeronautical Society, it seems, never authorized anyone to apply for a sanction.

THE RETURN OF LINCOLN BEACHEY.

Lincoln Beachey was one of the first to enter in the round-Manhattan race and had a special machine built by the Curtiss Company. A grievous accident occurred, however, during his trial flight which resulted in the killing of a spectator and the wrecking of his machine, which put him out of the contest which would signal his return to aviation.

The figures, as agreed upon by the New York Timers' Club, and the judges, who struggled through as best they could without the sanction, are as follows:

Luckey	52:54.0
Niles	54:55.0
Wood	58:19.0
Gilpatric	1:08:53.6
Jannus	1:13:57.0

Cups were also awarded by The Aeronautical Society to Luckey and Niles, the cups having been originally offered by O. Chanute through the Society to be given for meritorious service.

AVIATOR JEWELL DISAPPEARS

Albert H. Jewell, a graduate of the Moisant School at Hempstead, started early in the morning on Octo-13 to fly to the Oakwood Heights aerodrome to go in the Air Derby. Nothing has been seen or heard of him,or his 50 Gnome Moisant monoplane. Search parties have failed to find him. It is generally believed that he has been swallowed up in the marshes and quicksands on the south shore of Long Island. Some cling to the opinion that he got out to sea and was drowned. No wireless reports have been received of his having been picked up by any outgoing steamship. The Aeronautical Society has offered $400 for information and the Moisant Company $350.

TARIFF ON AEROPLANES LOWERED

The new tariff admits the importation of foreign-built aeroplanes at 20% ad valorem instead of 45%, as formerly. An aeroplane is considered as an entirety and comes under the heading of structures composed principally of metal. Motors alone are subject, also, to 20% duty.

I know of no better magazine published—*H. C. R., Othello, Wash.*

Since the first of the year exports of domestic aeroplanes and parts total 4, with a value of $18,395.

IMPORTS AND EXPORTS

For month ending July 31, foreign parts were imported at a valuation of $4,531; of domestic exports, one aeroplane and parts at $3,113; in the warehouse July 31, 3 aeroplanes and parts valued at $6,708. No exports of foreign made material.

We exported during August 4 aeroplanes and parts valued at $12,221. Three foreign-made machines and parts remain in warehouse, valued at $7,708. Only parts were imported, valued at $538.

INCORPORATIONS

The Hudson River Aviation Company of New York, Inc., of Manhattan, motors, engines, etc.; $30,000. H. W. Kays, George J. Foley, Thomas L. Cunningham, 46 Hamilton Place, New York.

The Intermountain Aviation Company of Salt Lake City, has filed articles of incorporation. The capital stock of the company is $20,000. C. A. Tyler is president, J. A. Kaufman, vice-president; S. D. Huffaker, secretary and treasurer. These with A. S. Ash, W. N. Hill, D. E. Howard and N. G. Morgan form the directorate. All of the officers are of Salt Lake City except Secretary Huffaker, whose home is in Tooele.

BUSINESS TROUBLES

Lulu Joyce has sued the Silver Lake Aviation Co. of New Berlin, O., to obtain judgment on a $500 note The motor mortgaged as security was not valaubl enough to cover the note and she asks for executio on other assets. Judgment was confessed and fore closure granted.

The case of Dr. D. S. Quickel, asking for the ap pointment of a receiver for the Arbogast Aero Com pany, Anderson, Ind., will be called. The Arboga Company, in which Dr. Quickel was a stockholder in vested several hundred dollars in an aeroplane an it is alleged the contrivance flew over into Wisconsi somewhere and has not been seen since.

How Joseph C. O'Flaherty, known in the aviatic world as Joseph C. Stevenson, did his flying on nurse's money until he finally met his death, at Bi mingham, Ala., on Oct. 8, last year was broug out Sept. 30 in the Surrogates' Court, New Yor in the course of an inquiry demanded by the aviato brother, William F. O'Flaherty of 152 West Fort eighth Street, administrator of the estate.

One matter in dispute was the ownership of Hall-Scott motor. Mr. O'Flaherty learned that t motor was still in the possession of Miss Libbie Dixon, of 246 West Fifty-first Street, and she w subpœnaed to the Surrogates' Court for examinatic

She said that she first met the aviator while was ill in a hospital in which she was a nurse. S had come into an inheritance of about $50,000 a gave up nursing. She bought his aeroplane and vanced $2,165 in payment for the motor. When met an untimely death at Birmingham the only thi she could do was to take possession of the motor.

FINAL DIVIDEND OF HERRING-CURTISS C

A final meeting of the creditors of the Herri Curtiss Company is called for the 1st day of Nove ber, 1913, to be held at the Court House in Ba N. Y., at which time and place an application will made for a final accounting by the trustee in t proceeding and for an order directing a final d dend to be paid to the creditors.

BAR AIRMEN FROM CANAL ZONE

Washington, D. C., Oct. 4—President Wilson signed an executive order forbidding the operat of aeroplanes or any other aeronautical craft o the canal zone without the written permission of chief executive of the canal zone. The order forbids the taking of pictures from any aeroplane balloon over the zone without similar permission. penalty is a fine of $1,000 or a term in jail not ceeding one year or both fine and imprisonment the discretion of the court.

E. V. Fritts flying at Oneonta, N. Y. in his 100 H-P MAXIMOTORED Biplane.

MAXI MOTOR

IN A CLASS BY ITSELF

For your Flying-boat, or cross country flying,

...MAXIMOTOR...

will fill a long felt want for an ideal aeronautic, power-plant.

Builders, as well as aviators, are MAXIMOTOR'S most ardent supporters.

For testimonials, and further particulars, just write to

MAXIMOTORS
ARE BUILT IN FOUR DIFFERENT SIZES
FROM 50 TO 150 H-P

MAXIMOTOR MAKERS
DETROIT
1528 JEFFERSON AVENUE E.

Airmen Should Be Interested In Photography

THE PHOTOGRAPHIC TIMES

Has long been regarded as the standard American Authority on photographic natters.

Each number has forty pages of interesting photographic text, printed on fine paper rom good tvpe, and illustrated with many ttractive half tones.

The cover for each month is printed in arying colors, and is ornamented with a ifferent and pleasing photograph.

The valuable and authoritative formulae urnished throughout the year are alone vorth the price asked for subscription.

Some of the other regular features are

Articles on practical and timely photographic topics.

Illustrations showing examples of the work of the best American and foreign pictorialists.

Foreign Digest.

Camera club happenings, exhibitions, and photographers' association notes.

Items of Interest.

A department devoted to "Discoveries."

Reviews of the new photographic books.

Description of the latest novelties and specialties brought out by dealers and manufacturers.

NE DOLLAR FIFTY A YEAR SUBSCRIBE NOW **FIFTEEN CENTS A COPY**

Foreign Subscription, Two Dollars **A Sample Copy Free**

HE PHOTOGRAPHIC TIMES PUBLISHING ASSOCIATION
135 West 14th Street, : : : New York

In answering advertisements please mention this magazine.

MODEL CONTESTS

New York, Sept. 27th, 1913.—A very exciting contest for duration for models rising from the ground was held at Van Cortlandt Park today. In spite of the strong wind prevailing, excellent flights were made. The contest was won by Carl Trube, a 12-year-old Yonkers boy with a flight of 60 seconds. Trube, in spite of his youth, has proven a wonder at the "game," and has been a winner of most of the contests held here lately. Excellent flights were also made by Kipp, Radcliff and McLaughlin. The prize was a bronze medal donated by the Aeronautical Society. Official timer, Mr. Edward Durant.

New York, October 24th, 1913—Carl Trube again proved to be the winner of the contest held here at Van Cortlandt Park on the above date, with a flight of 61 seconds. The prize was a copy of "Harper's Aircraft Book for Boys," donated by Mr. Edward Durant of the Aeronautical Bureau.

Oakwood Heights, S. I., October 13, 1913—A number of contests were held here in connection with the flying tournament of The Aeronautical Society. In spite of the strong wind prevailing in the morning, which kept the full-sized machines on the ground, at times the air was literally "full of models." The antics and capers of the models in the strong wind demonstrated their stability and seemed to greatly amuse the crowd. Much amusement was caused by a model striking the roof of a hangar, bouncing off and continuing its flight as if nothing had happened.

The contest for models rising from the ground was won by W. F. Bamberger with a flight of 65 3/5 seconds. He was hard pressed by G. A. Cavanagh, who was forced to withdraw from the contest, owing to a mishap to his model. The Tractor contest was also won by W. F. Bamberger with a flight of 25 seconds. Lester Ness was second with a flight of 24 seconds.

Many of the flyers were provided with models unsuitable for entry in the contests and they proceeded to demonstrate the flying qualities of the models.

Excellent flights were made by L. P. Steinberg, a diminutive member of the New York Model Aero Club, W. F. Bamberger, L. Bamberger, Harry Herzog, Olson, Braun, Ness and others too numerous to mention. Among those present was the former world's champion, Armour Selley, who, although not provided with a model of his own, endeavored to entertain the spectators by showing that he could fly others' models as well as his own. Mr. Nicholas S. Schroeder, the well-known model flyer and writer on the science was also present and endeavored to explain to the various model flyers, the proper method of flying their respective models. The contests were a great success in every respect.

All questions regarding models and model flying may be addressed to the model editor, Harry Schultz, 23 West 106th Street, New York City, N. Y.

MODEL CLUB NOTES

The Long Island Model Aero Club members, owing to the increase in interest, have had a very busy summer, and new members are being added regularly. The club held a biplane contest lately, the results of which appeared in last month's issue, C. Freelan being the winner with a duration of 57 seconds. As far as can be ascertained at the present time this constitutes a world's record for biplanes. His biplane, a splendid piece of workmanship, flew very steadily and easily captured the prize, a handsomely engraved silver medal.

Biplanes have become very popular with the members of this club and many very fine specimens of workmanship are being brought out. Hartman's biplane has surpassed all others in spectacular and exhibition flights. The flying field of the club has been changed and all flying is now done at Liberty Heights, Woodhaven, L. I. The club has under consideration the construction of a man-carrying glider and a committee is investigating the cost, method of construction and design.

Among the many new and novel models developed is a steady Dunne type monoplane built by Freelan. A small heavy R. O. G. speed model has been constructed by Shotwell and has proven itself to be one of the speediest and finest spectacular flyers ever constructed and is constantly duplicating the stunts of Pegoud in model form. Dan Criscouli's four foot model proved to be a very steady stable distance and duration flier. Charles V. Obst, the president of the club, has experimented with and has lately perfected a new type of rubber motor by which a model can be flown with about one-fifth the length of rubber used. The power is the same and a great saving in weight is made. He has also constructed a new style model glider which has proven to be a remarkably steady and efficient flyer. Tractor models are being given much prominence by the club members and excellent flights have been made with models of this type by Obst, Braun, Ness and Funk. Persons in the vicinity of the club interested in models and model flying can not do better than to join this club. All applications can be addressed to the president, C. V. Obst, 40 Grant Ave., Cypress Hills, L. I.

MAN-MADE MUSIC RIVALS THE BIRDS

Captain G. L. Bumbaugh, the veteran balloon man is responsible for furnishing the songsters of the air above Indianapolis with piano music for he recently ascended with a Baldwin player piano attached to one of his balloons with a young lady operator playing sweet tunes and Bumbaugh reclining on the top of the piano just under the load ring. On landing the drag rope was caught by spectators and to show the piano to be still playable Miss McDonald favore the natives with another tune.

ON SCHMIDT'S DEATH

Charles H. Schmidt, brother of George Schmid who met with a fatal accident at Rutland, Vt Sept. 2, writes regarding it:

"When at an altitude of 500 feet the motor bega to miss fire—dirt in carburetor—and George imm diately started a volplane. Spellman, the passenge lost his head, rose from his seat and stood on the rear control wires which passed between his le This terrible strain broke the rudder wire. Then t passenger reached forward and seized my brothe shoulder control and pulled that toward him. Th of course, threw the plane on a steep bank. Wi the rudder control gone, George was powerless straighten again, while the passenger hung desp ately to the shoulder control. My brother struggl hard to bring her back, but he could not get out Spellman's grasp. The machine took a very ste or sharp turn and crashed to the ground. Geo stuck to his seat trying hard to straighten the pla while the passenger freed himself entirely from seat, still hanging on to the shoulder control. T actual fall was about 200 feet. Spellman esca with a few slight injuries."

CLUBS COMBINE IN PHILLY

At the reconciliation meeting of the Aeronaut League of Pennsylvania and the Philadelphia A Club on Sept. 26th, a firm foundation was laid the new organization. Every member seemed v active in the new project with the result of the lowing nominations for officers:

President, Walter Bryan, Edwin J. Doyle; v president, Joseph J. Hickey, Kenneth Robertson Reginald Woodcock; secretary, D. Earle Dunlap, W lian Keck and Percy Pierce; treasurer, Ha Woodcock, Alan McMurry, Donald Robertson, Earle Dunlap and Percy Pierce.

The election took place Oct. 3rd at 8 p. m. meetings for the time being will be held at 610 S 31st Street.

The Kemp Machine Works of Muncie, Ind., m facturers of the well-known Kemp air-cooled aero motors, announce that they have secured Mr. J G. Hanna to take charge of the sales department. Hanna has been actively connected with the busi side of aviation since 1910 and is thoroughly fam with all branches of the sport. Intending purcha may be assured that their wants will be well promptly attended to. This enterprising firm ports business excellent. They have booked six or in the past three weeks which certainly is not for this rather dull time of the year. While American market has so far been monopolized the water-cooled motor, there are evidences change of opinion. The Government's apparent erance for Renaults is significant.

There are reasons for the change. It is now gen-
rally admitted that an engine can get the most
ower out of the gasoline when it is operating at a
:mperature around 350 degrees. If ample bearing
nd wearing surfaces are provided, high-grade ma-
:rials used, and an efficient lubricating system in-
talled, a motor can function perfectly at this tem-
erature for any desired time, and without undue
epreciation. To thus get more power from a given
ylinder size, or the same power from a smaller cyl-
ıder, of course, means less weight per horsepower.
ınd to eliminate the chance of radiator leakage or
f the water boiling away is, of course, another step
›ward reliability.

Mr. Kemp states that the factory is running full
me and keeping well ahead of orders. The firm
ıakes it a point to always have motors in stock ready
›r immediate delivery. It is expected that the new
-cyl. 75 H. P. model will be ready for the market in
ıe spring. Prospects for a big business next year
re regarded as excellent.

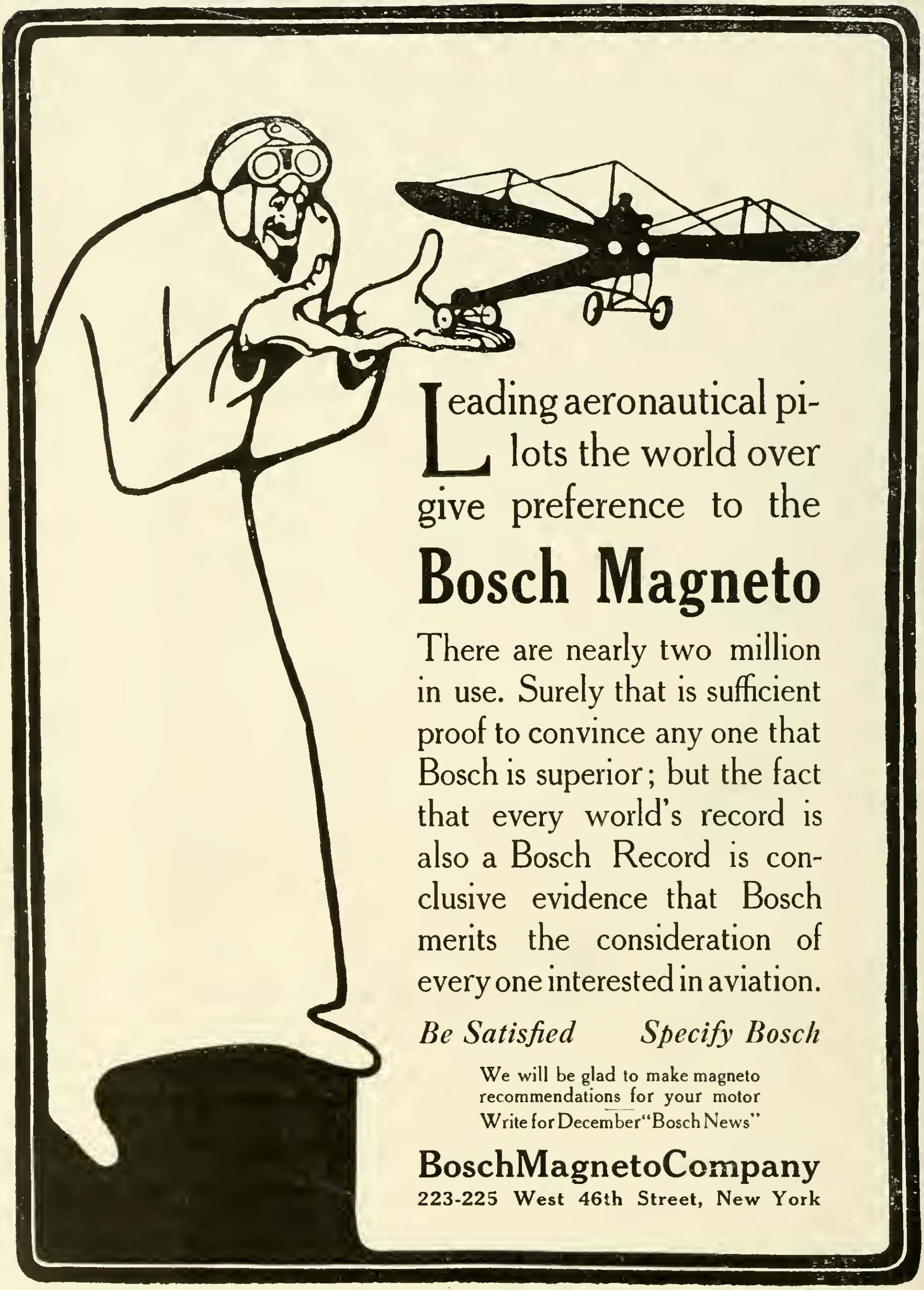
YOUNG GERMAN AVIATOR—Engineer and onstructor of flying machines not infringing Wright atent, Licensed Pilot, late Constructor and Instructor ith German firm, Expert on Gnome, Mercedes and .rgus motors, Driver high power autos and Motor-yclist, is looking for position with firm or private wner of a Flying Boat, etc. Speaks English. Ad-ress, German Aviator, care of AERONAUTICS, 22 E. 25th St., New York.

AVIATOR WANTED who can fly a Curtiss type ıachine. Apply to George E. Yager, 119 N. 15th treet, Omaha, Neb.

FOR SALE—Tractor Biplane. Genuine Benoist 913 model. Good as new. Will demonstrate. Ad-ess Tractor, care of AERONAUTICS, 122 E. 25th :., New York.

ERONAUTICS

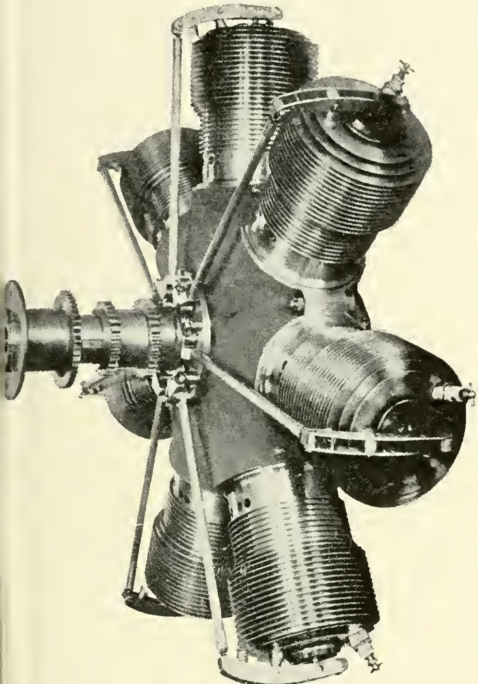
. No. 5 NOVEMBER, 1913 25 Cents


Leading aeronautical pilots the world over give preference to the
Bosch Magneto
There are nearly two million in use. Surely that is sufficient proof to convince any one that Bosch is superior; but the fact that every world's record is also a Bosch Record is conclusive evidence that Bosch merits the consideration of every one interested in aviation.
Be Satisfied Specify Bosch
We will be glad to make magneto recommendations for your motor
Write for December "Bosch News"
Bosch Magneto Company
223-225 West 46th Street, New York

REVOLVING CYLINDER MOTORS*

By EMILE BERLINER.

Any man who is a member of an organiza-ion in which Mr. Hammer is a leader is sure o be live and progressive. I presume you nembers are familiar with motors in general nd there is no need to dwell on the features of the various internal combustion engines. The automobile has been of service in devel-oping the aeroplane and the airship through he education given in motors.



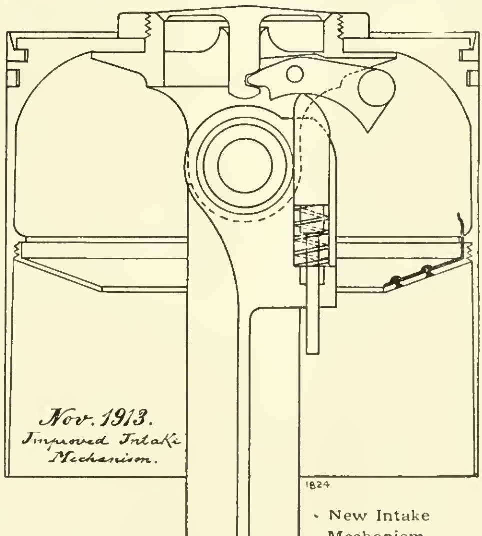
Latest Gyro Motor of 80 H. P.

There is no need to discuss the status of the eciprocating motor. It has its good points nd its limitations, as, for instance, the fly-heel which adds weight, the muffler which onsumes power, vibration. etc. With the otary motor, we have the difficulty of cooling contend with.

It was a long time before our shop settled he question of whether or not a revolving linder motor was a reciprocating engine. inally I asked Mr. Simmons to make a model f our motor, showing the cylinders and pis-ons, etc., in fact, a complete cross section of . When ready and rotated one side figured hat the pistons had a movement of about 4 .

The other side then took a circular piece of ardboard, covered up the major portion of he pistons so that only their tips extended yond the cardboard sheet (illustrating) and is showed that there was no reciprocating motion left. There is reciprocating motion in that the gas action is reciprocating; also a slight amount in the connecting rods moving left and right.

To give you the history of our motor, we were experimenting with a helicopter in 1901-3 and it was necessary to have a very light motor. After trying the lightest reciprocating motors we could obtain, we heard a few years later that a rotary motor was being made by the Adams Company, of Dubuque, Ia., and that several were being used in automobiles. I sent Mr. Moore out there to see if they would make an engine of very light weight. The weight of these motors at that time was very considerable, probably 20 pounds per H. P. "Can you make one of 3 or 4 pounds per H. P.?" They finally said, "Yes." They succeeded in producing two motors of about 30 H. P., weighing less than 100 pounds each. These motors were built in the winter of 1907-8 and were the first light weight revolving cylinder internal combustion motors ever made. One is now next to Mr. Langley's radial reciprocating motor in the National museum in Washington. While we do not know whether the French or Gnome makers, knew of this or not, they did not come out with the Gnome until the latter part of 1909, so that this country has not pirated anything in the way of rotary



New Intake Mechanism of the 80 Gyro

aeronautic motors. It is strange that in all these years there should be only one or two successful rotary motors in the world when it is well known that the Gnome has been a great financial success. The reason is that it is not easy to make such motors.

The very highest type of workmanship is

(*Continued on page 171*)

*Paper read before The Aeronautical So-ety, November 20, 1913.

GORDON-BENNETT BALLOON RACE

By CAPT. H. E. HONEYWELL.

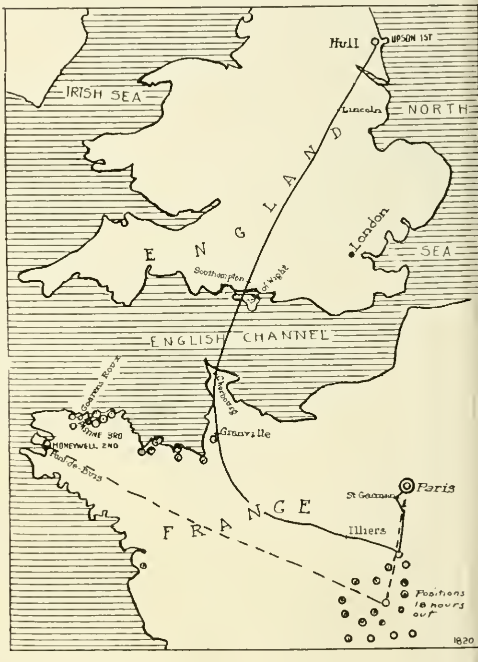
The great international balloon race, in which the Yankees carried off all honors with colors flying, started from the Tuileries Gardens, a beautiful spot in the very heart of Paris, President Poincaire giving the word that released the first at 4 p. m. and the others every five minutes thereafter, in the presence of an enthusiastic crowd of 500,000 people of all nations. They gave all a hearty cheer, especially the French and American balloons, as they proved the favorites.

"Uncle Sam" took the air gracefully at 5 p. m., No. 12 in the race, and the only other American balloon, piloted by Upson and Preston followed No. 17. All made a fine getaway to the south. We weighed off heavier than all, just tipping the tree tops and missing the Louvre by a few feet followed up the Seine. The people went wild.

The next morning found us about 150 miles south of Paris, with 13 balloons in sight, all around, above and below us. How to get away from our competitors was a great question. Finally about 10 a. m. the light breeze veered around carrying all to the northwest, the altitude varying from 3,000 to 7,000 feet. Mr. Wade, my worthy aide, and myself held a regular council of war in the basket for two hours at the same time feeling for new air currents that might spring up. Something had to be done; we were getting desperate. Finally we located one very thin current running to the west, near the earth and underneath the clouds now forming. Either one of two things could be done: make a great altitude at a great sacrifice of ballast, with no certainty of finding the usual east current that would carry us over the Alps; or valve down, run underneath our competitors to the west, gain the outside of the circle, putting all nearer Paris and in a trap, as it were, make for Brest, the extreme west point of France. We decided on the latter course, and it proved excellent. Every time we passed under one of our competitors we would kiss them good-bye, knowing that they were out of the race unless they crossed the channel during the second night, which we figured they would not do—surely a trap if we could hold our position.

Upson and Preston out-nerved the rest and landed up in England, distance 400 miles, taking first honors. Good for them! However, fortune favored them somewhat. By starting last in the race they did not backtrack nearly so far as some others, hitting the channel early in the evening and at a narrow point, Cherbourg, while the rest did not draw up to the channel until after midnight, at a much wider place further west.

We struck the Bay of Biscay at the northeast corner about dusk. Throwing a little ballast, we ascended to the northwest current, followed along the shore, with nothing but lighthouses in sight. The clouds obscured the moon, very dark, altitude 2,000 feet, making 12 miles per hour. At about 10 p. m. two more lighthouses showed up just ahead, on either side. Knowing we were nearing the west coast and our trip must necessarily terminate shortly, as Ireland was several hundred miles away and the only land in our path, we valved quite near to earth, continuing on for some time, with a sharp look-out for the ocean. Suddenly the moon broke through the banks of fog clouds, and showed the shimmering water about $\frac{1}{4}$ mile ahead, with no more lighthouses to invite us further. We valved a hasty descent. Touching earth lightly, I pulled the panel, and the balloon laid over on a steep hillside, with the basket trying to roll backwards down the embankment. After extricat-



ing ourselves from the general mix-up of sand provisions and water, of which we had plenty for another day's run, we looked at our watch 10.30 exactly, $29\frac{1}{2}$ hours out.

Making a house of our basket we rolled up in our steamer rugs for the night, damp and cold. Daylight found us preparing a hot breakfast on our lime stove. Soon a few hundred natives gathered. After exhausting our limited French we resorted to the sign language that worked so well in Russia last year. After securing a wagon, we drove to Pont de Buis (Finistere), province of Brittany and caught the train for Paris, winners of the second prize.

It is rumored in Paris that "Uncle Sam" is a French creation. She is strictly an all-American balloon, made by the French-American Balloon Co., of St. Louis, Mo., as was the old "Uncle Sam" that took third honors for America in the 1912 Gordon-Bennett, from Germany to the tall porcupine forests of Russia, 1,100 miles away.

THE INTERNATIONAL BALLOON.

The accompanying sketch has been drawn by Captain H. E. Honeywell to illustrate his airmanship in dropping to a lower western current to obtain further distance before reaching the ocean in the international ballon race of October 12th in which America won first and second place. Upson and his aide Preston "out-nerved" the other contestants, numbering eighteen, from eight different countries, and Honeywell and Wade "out-generaled" them. The circles near the bottom of the map show the relative positions of the balloons 18 hours out from Paris, the start; the others mark the landings.

The official distances made by the three obtaining places are as follows:

Upson and Preston (America), 618 kils.; dur. 29 h. 35 min.

Honeywell and Wade (America), 483 kils.; dur. 29 h. 35 m.

Capt. Pastine (Italy), 457 kils.; dur. 32 h. 25 m.

The French balloons finished sixth, ninth and thirteenth.

HOW WE WON THE GORDON-BENNETT

By R. A. D. PRESTON.

The Gordon-Bennett Cup was won this year by taking every advantage of winds at the different altitudes, of our knowledge of the probable meteorological conditions over Great Britain, and our willingness to sacrifice gas and ballast to maintain the proper direction. Practically all of the voyage was easy sailing and most of it at moderate speed. Drag-roping across the lower part of Yorkshire in the storm and the landing less than 300 yards from the cliff at Bempton (Yorkshire) were rather exciting, and while crossing the southern part of England we made great speed; otherwise there was little excitement during the trip.

The "Goodyear" had been carefully groomed for the race, and behaved excellently throughout. Our equipment of navigating instruments is very complete, and proved of utmost service, as, given a tight balloon, it was direction rather than endurance that would count in the peculiar weather conditions then existing.

We were well provisioned, carrying non-perishable food and water sufficient for five days (in case of landing far from habitations) and a nice box of sandwiches, cakes, cheese, and fruit to eat in the air. Thermos bottles of malted milk, coffee, and a bottle of milk completed the list.

We took no stimulants on this trip, except, of course, a bottle of oxygen and a respiratory apparatus for use at high altitudes. This last was not used, however, as the third day out, when ordinarily we should have gone high, we kept low over England to prevent being blown to the east.

Except at our maximum altitudes, over the Channel, it was not excessively cold. Here we were glad to make use of the heavy blankets and woollen leggins our trial flight from St. Cloud on October 6 had shown us were required.

The start of the race from the Tuileries was beautifully managed, and the "Goodyear," No. 18, ascended at 5.25 p. m. and sailed away low over Paris to the southeast. Most of the other balloons were visible, those which went high bearing to the west. Our compatriot, Honeywell, was also going low, and, as long as we could see him, farthest of all to the east.

We remained at about 1,000 ft. during the night, gradually working round to the west, passing over Illiers at 6.15 p. m. and Nogent at 7.53 p. m.

Monday was a beautiful day. We let the balloon rise with the sun to 5,800 ft., remaining till after 12 o'clock in fine equilibrium. The course at that altitude was nearly due west. The light, cumulus clouds below us over the green fields and white villages made a pretty picture.

At 11.15 a. m. we sighted Berliner for the second time, approximately 15 miles to the southeast, and in another half hour nine balloons were in sight from southeast to southwest all higher than the "Goodyear."

In the afternoon the wind (at 5,800 ft.) worked round towards the south a few degrees. Remaining at this altitude till about 3 o'clock, we were then a few miles south of Mortain. Knowing that the wind at 5,800 ft. at least would easily take us across the Channel, and that to beat Brest we would have to reach Hull on the east coast of England, Upson proposed descending, on the chance that the surface currents would veer sufficiently to the south to allow us to drag-rope across the Channel, for which we had a particularly suitable drag rope. By 4 p. m. the barograph showed 2,300 ft., but the wind was carrying us too much towards the west. Overboard went a little ballast, and soon the "Goodyear" was up to 13,000 ft., sailing finely to the northwest.

At 6.20 the coast north of Granville passed beneath us. Over the Channel, however, due to the radiation from the water, we rose to 8,200 ft., where the direction was too far north and carried us overland again near St. Germain. Dropping slowly, the direction became

more favorable, the wind carrying us out over Armond Ville la Roge (14 miles west of Cherbourg) at 10.25 p. m. At this point I took charge of the balloon while Upson got a little sleep.

We were but a short time at sea before the lights of St. Catherine's Point, the Needles, and St. Albans' Head, together with several others I did not recognize, were visible, and it was easy to chart our course from bearings on these lights. On this night, as well as on the previous one, the moon shone brightly and nearly full, and several steamers were visible below.

Berliner had followed us all the afternoon, and looked as though he were coming across the Channel, but we lost sight of him a little east of Granville.

Crossing the Channel the "Goodyear" gradually descended to 3,600 ft., and at this height I watched, with keen satisfaction, the Isle of Wight bluff pass beneath our basket at 2.7 a. m. The wind was coming more and more from the west at this elevation. Soundings showed a better and faster current near the ground, so down we came to below 1,000 ft. and struck off north through England at a tremendous speed, most of the time in low, heavy clouds. The moon became obscured shortly after landfall, and we saw neither moon nor sun again. Crossing the river just below Southampton I hailed a steamer below and got a reply, which, however, I could not make out.

It was now only a question of keeping as far to the west as possible, but only to 600 ft. were the currents favorable, and Upson, now at the helm, displayed great skill in holding the "Goodyear" just above the trees without crashing into obstacles. We kept this up an hour or so. Ballast was going fast, however, and as it was now day and the wind not quite so strong, we cut loose the drag rope and trailed for miles through Lincolnshire. After repeated hailings we located ourselves precisely near Lincoln. Near the ground the direction of the wind would just enable us to make Hull, now our objective.

At 11.30 a. m. the "Goodyear" shot out over the Humber, south of Hull, the drag rope leaving a white wake in the river 300 ft. below. It was now quite stormy, the wind more violent and gusty, and pouring rain. The "Goodyear" is provided with a drip-band near the bottom to drain off rain outside the basket, but we had lost so much gas that this was no longer efficient, and a mean drizzle spattered down on our heads.

As we had sufficient ballast now to reach the sea, and drag-roping in the storm was anything but pleasant, Upson let the "Goodyear" rise to 800 to 1,000 ft. to test the upper currents, while I watched the misty horizon for the North Sea. After one or two false alarms we sighted it near Bridlington, but the wind veered round sharply here and for a few minutes there were hopes of our going still further north. A sudden squall caught us, however, and from a good altitude I saw the water over Buckton Cliffs. Less than a quarter of a mile away, Upson made a remarkable landing. We dropped in a turnip patch only one field away from the edge of the cliff. It must have been blowing at least 35 miles an hour, and the basket rolled and slipped along over the uprooted turnips at a great rate. I remember thinking at the time what fine roller-bearings these turnips made. For an instant or two it looked as if we would not bring it up short of the cliffs, and Upson told me afterwards that he had been figuring on the quickest way to get over the edge of the basket. We struck a confusion of earth, fence and hedge at the end of this field, however, and it held the basket long enough for a good deal of gas to escape through the large slit made by pulling the ripping panel. A few feet beyond this hedge the basket came to rest, and the voyage was ended. We ran to the edge of the cliff and congratulated each other that we had stopped just in time.—*British Aeronautics.*

ROBERT G. FOWLER'S VIEWS.

Mr. Ernest L. Jones,
New York, N. Y.

My Dear Mr. Jones,—Have been perusing your October number with a good deal of interest, particularly as regards comparisons of activity in this country and abroad; but when you stop to consider the market the European maker has to demonstrate his planes to and the national pride in their achievements.

In this country flying comes under the head of circus stunts, whereas in Europe they justly regard it as scientific advancement.

To-day's paper recorded the death of two more army fliers. It seems time that they should be safeguarded a little, provided with speed and angle indicators, and not allowed to blindly grope their way to a knowledge of flying.

I have used such instruments since 1911, and have been saved many a nasty smash through their quick indication of a plane's misbehavior.

It is also a fact that my plane is the only one in the United States that has a motor speed indicator, incidence indicator, and an aerometer to show flying speed.

Speaking of arousing interest in the flying exhibitions in large cities, it is interesting to cite our experience here with our water planes.

On November 16 we had five planes in action along the bay shore of the Panama Pacific grounds, a charge of twenty-five cents being made, motor-cars fifty cents, and the attendance after only eight days' advertising was around 6,000.

Last Sunday, the 23rd inst., we had nearly thirteen thousand people inside and a large grand stand completely filled. Am enclosing the list of events run off with six planes in action a great deal of the time.

ROBERT G. FOWLER.

THE WRIGHT AEROBOAT

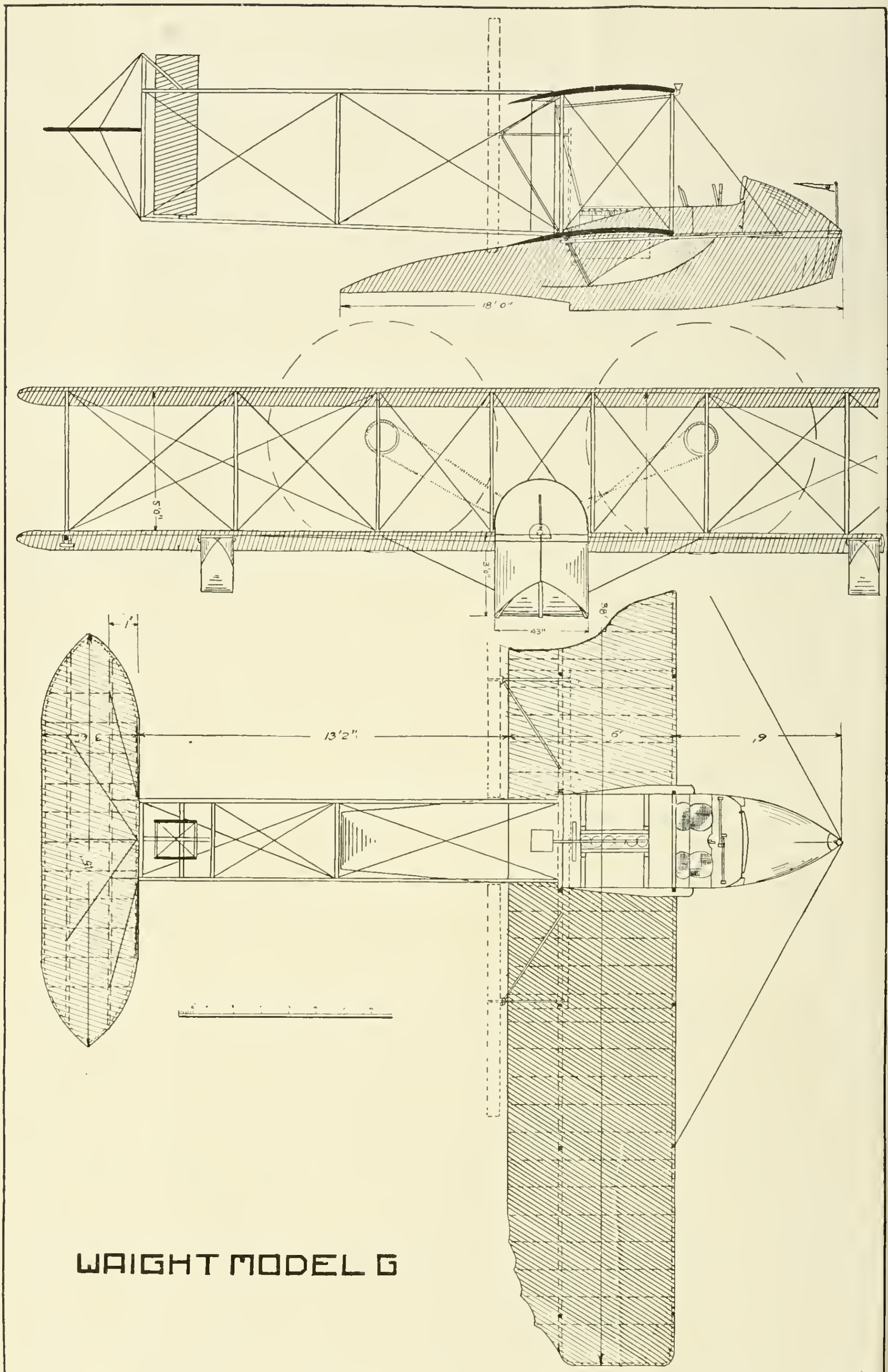
The Wright aeroboat may briefly be described, therefore, as a step in which hydroaeroplane and flying boat characteristics have been altered to give a new type. The machine consists of two distinct parts: the boat hull containing the seats and motor, to which is rigidly attached the aeroplane structure, consisting of wings and rudders. The two seats side by side are placed in front of the main surfaces, the motor is set below and behind them, and drives two propellers in the customary Wright fashion. The aeroplane and rudder details are quite similar to the standard Wright type "C," excepting that the strut arrangement is altered, and due to the concentration of the load at the center, the wiring and joints have necessarily been made of much larger and stronger section. The span of the surfaces is 38 ft., the chord is 6 ft., and the total lifting surface is 432 sq. ft. The propellers are 8½ ft. in diameter and are driven by the motor at 600 r.p.m. The elevator which is raised to the center line of the propellers is 48 sq. ft. in area and with the large type "C" rudder, and the enormous transverse control that is given by the warping system, the control in the air of this machine is more powerful than on other marine aeroplanes.

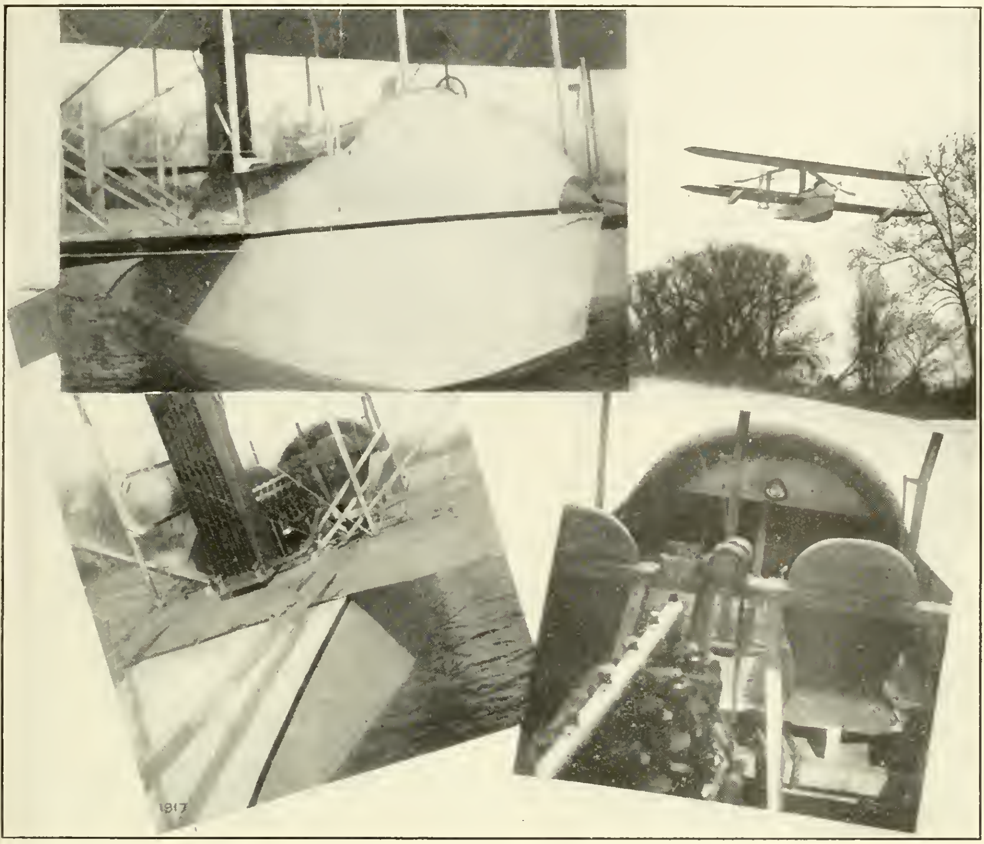
Perhaps the most interesting part of the machine is the boat hull itself, which is of novel construction and which inaugurates a new type of craft. The hull is made of special metal alloy, treated so as to prevent corrosion by salt water, and more nearly approaches in its hydroplaning qualities, good practice of motor boat work than has previously been done. The hydroplaning part of the hull consists virtually of two hydroplane surfaces, both presenting their most efficient angle to the water at the same time that there is given the best lifting angle of the planes, and the best line of thrust of the propellers. The rear plane has been studied with extreme care, as the angle of this plane for its highest efficiency requires consideration of the wave thrown back from the front hydroplane surface.

The hull is 3 ft. deep, 18 ft. long and 43 in. wide. The weight of the hull fully equipped is 300 pounds. This includes the motor bed and seats, dash board, etc. Its strength, not only due to its compact form, but due to the manner in which the framework back of the metal has been designed, is enormous. The hull is divided into six entirely water-tight compartments. The hull is water-tight throughout, the motor and seats being set above the top of the water-tight portion, so that the hull itself is really in this sense a pontoon. There is no possibility, therefore, of shipping water and adding to the weight of the machine.

The arrangement of the seats and controls is exceedingly neat, and effective, and approaches in appearance, as well as comfort, to automobile practice. The engine is operated entirely by foot throttle combined with a throttle lever exactly as on motor cars. A dash board is fitted on which the instruments are placed, and back of the hood, conveniently at hand, are a klaxon horn, priming can, starting crank, anchor and anchor rope. The anchor rope is passed out through a port in the extreme bow of the machine, a very neat detail, which makes anchoring easy, and quick of operation. The starting mechanism consists merely of a safety starter, geared up from the motor. The handle is inserted on the auxiliary shaft back of the seats, and is easily turned with one hand. The motor is very accessible from the seats, even permitting of replacing spark plugs while in flight and of easy inspection. Being at the rear, the noise and exhaust are entirely away from the operator. A small flag is fitted at the bow to indicate, as in usual Wright practice, the least tendency of the machine to skid.

The manner in which the seats are closed in, the form of the hood, and the neat side doors and steps fitted, make the entire arrangement not only finished in appearance, but perfect in protection against air and waves.


18' 0"
5' 0"
3' 0"
43"
13' 2"
6'
1'
WRIGHT MODEL G



The total weight of the aeroboat ready for flight is 1,200 pounds. The live load that has been carried in the tests at Dayton has amounted to practically 600 pounds, making the total load in flight, 1,800 pounds.

The machine is equipped with a six-cylinder, 60 H. P. Wright motor, which gives 30 pounds carried per H. P., the highest figure yet attained in marine aeroplane work.

In addition to the main center pontoon, two auxiliary pontoons are fitted. These are also made of metal, weighing 11 pounds apiece, and are of a form which insures the correction of the balance of the machine with the least amount of drag, a feature which for rough water work is of the utmost importance.

The control of the craft on the water is done entirely by the side paddle system, invented by Grover C. Loening some time ago, and used by him in his early aeroboat experiments. This method of control is far more effective than a water rudder, and turns the machine at high speed in any kind of wind.

The aeroboat was designed by Grover C. Loening under the direction of Mr. Orville Wright, and was entirely constructed at the Dayton factory.

REVOLVING CYLINDER MOTORS.

[*Continued from page 165*]

imperative and one has to contend with the well-known formula of centrifugal pressure, according to which each pound of weight rotating at a distance of 1 foot from the center of rotation at 1,100 r.p.m. produces a centrifugal pressure of 412.6 pounds. Every moving part has to be calculated with reference to that law. Everything must be made of the finest steel, perfectly balanced, perfectly hardened. If not balanced there is produced a knocking. All wearing parts must be perfectly tempered, especially the valves and the mechanism operating them.

(Here Mr. Berliner illustrated his talk by reference to the moving model of the Gyro motor.)

The makers of rotary motors are engaged right now in attempts to produce a motor with but one valve, leaving out the intake valve. I believe it will be accomplished successfully. It has been done in a way but not yet economically. (Illustrating on model.) The intake will be very similar to that in two-cycle engines. When that time comes, we will have the model motor for aeronautics and it ought to run a hundred hours without any trouble. In the Gyro motor we have reduced

[*Continued on page 180*]

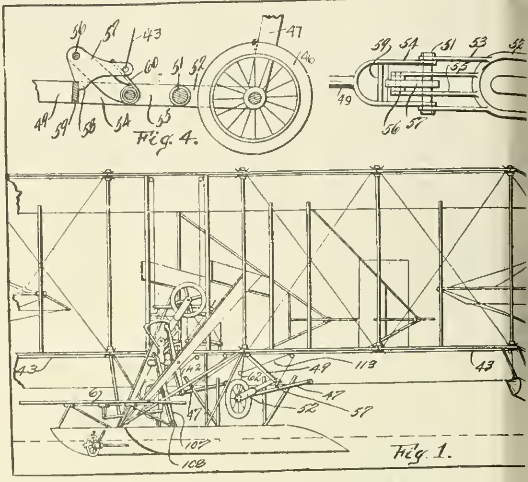
NEW DEVELOPMENTS IN AERONAUTICS

CURTISS RUNNING GEAR SYSTEM.

A device for equipping water 'planes with wheels which can be raised or lowered while in flight has been patented by Glenn H. Curtiss in Great Britain (12,643).

The claims cover the combination of surfaces with float, hydro surfaces at wing ends capable of variation of inclination, ailerons, wheels which in lowered position project through the float, with locking device.

In order that the operator may vary the inclination of the floats and blades, there is provided a lever 42 connected to a wire 43 leading to each float, so that by movement of said lever from the position shown in Fig. 2 to that shown in Fig. 1, the floats, and with them the blades, may be inclined upward. Movement of the lever in the reverse direction allows the floats and blades to return to a horizontal position where they will exert slight head resistance to the rush of air. At rest on the water, the floats may be allowed to take the horizontal position. When the machine is started, the operator may throw his lever to incline the floats and blades, as shown in Fig. 1, and they will then act as a stabilizing means. Wheels are hung from the machine and project slightly below the lower surface of the boat, as indicated in Fig. 2. For raising the wheels out of the water when the machine is floating, and for depressing the same at will, 47 is a brace pivoted at 48 to the frame of the machine, and 49 is another brace pivoted at 50 to the frame, and at 51 pivoted to a short arm 52. A locking device shown in Figs. 3 and 4 in detail operates to hold the wheels in their depressed position shown in Fig. 1. As shown in Figs. 3 and 4 the wheel is pivoted to the U-shaped frame 52 having projections 53 pivoted to the U-shaped end 54 of the brace 49. Bent arms 55 fixed to the frame 52 carry pivoted to them at 56 a locking detent 57, which has a catch-nose 58 engaging a bar 59 on the U-shaped frame 54. 60 is a spring normally holding the latch in the position shown in Fig. 4. The preferred mechanism for raising the wheels comprises a slidable rack bar 105 engaged by a spring-pressed detent 106. 62 is a wire connected to the bar and running to the axle of the wheel, being led over suitable pulleys such as 61. 107 is a foot lever pivoted to the boat at 108 and carrying a spring dog 109. 110 is a spring to draw lever 107 backwards. As the foot lever is reciprocated it forces the bar 105 downwardly, being held by detent 106 at each reciprocation, drawing on wire 62 and collapsing the frame 47, 49, 52 to the raised position. The holding latch 106 may be tripped by a wire 111 and handle 112 adjacent to the operator's seat. In order to release lock 57 a wire 113 runs therefore to a pulley 114 loose on wire 62. This latter is slack when the wheels are down and locked, and as the slack is taken up it draws on wire 113, unlocking latch 57 just before wire 62 becomes taut. Of course, the other wheel is provided with the same construction, the wires 62 of both wheels being connected to rack bar 105. Releasing the detent 106 before the machine comes out of the water allows the weight of the parts and the resistance offered by the water to throw the wheels back to the locked position. The machine may then travel out of the water onto the land and over the same without the resistance which would be exerted by the boat if in contact with the earth.



THE AUSTRO DAIMLER MOTOR.

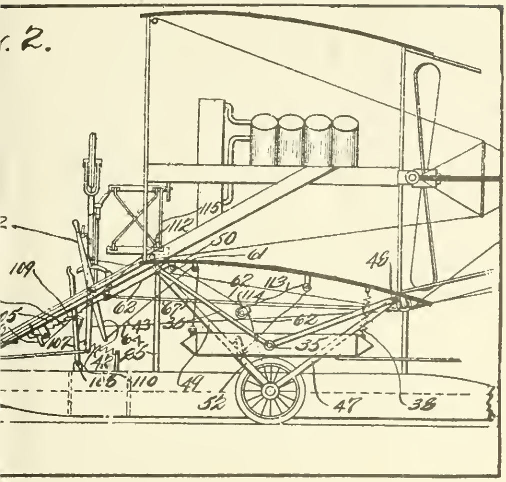
The 90 H. P. Austro Daimler motor, with one of which one Thomas flying-boat is equipped, has recently been tested by the Austrian army authorities.

Previous to the first test the engine was tested on the dynamometer, and was found to deliver 80 B. H. P. at 1,310 revolutions per minute. It was then disconnected from the dynamometer and the propeller fitted that the engine was to drive when in the machine. The engine then ran without a stop for 20 hours under full load.—Average number of revolutions per minute, 1,320.

At the end of this run the engine was voluntarily stopped for half an hour and examined. Everything was found to be in perfect order, and no adjustments at all were necessary. Following directly after the half an hour's stop the test was resumed and the engine ran for a further 20 hours without a stop, under full load.—Average number of revolutions per minute, 1,320.

At the conclusion of this period the engine was again voluntarily stopped and once more connected up to the dynamometer, and was found to be delivering the same power as before the tests.

The engine was straightway dismantled and the parts examined by the army officials. It was found that no visible wear had taken place and that all the parts were in perfect condition.



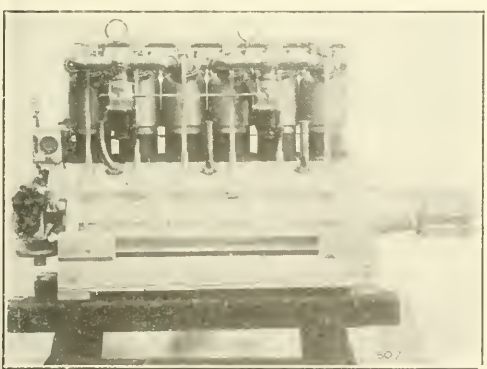
The 90 H. P. Austro-Daimler has recently undergone several alterations in detail all of which go far towards improving it as an engine for use under all manner of conditions while making no real change as to its reliability.

The cylinder (120 by 140 mm.) attachments are different. At the bottom of the cylinder a pressed steel flange is screwed on to the barrel. This flange is drilled to take seven holding-down bolts. There is little likelihood of cylinders leaving the engine in future.

A propeller carrier, consisting of a flange and collar in one piece, tapered to fit the crankshaft and keyed in two places, is supplied with every engine. A second detachable flange-piece bolts to the other.

The Bosch magneto fitted is wholly enclosed that it may be both dust and waterproof—a most necessary provision in these days. It is of the two spark type (that is, it sparks simultaneously on two plugs in each cylinder).

Each of the sparking plugs has a fibre and porcelain cover, thereby ensuring that it will not short-circuit even in the heaviest rain.



Another necessary provision has been made as a result of several serious accidents which have recently occurred with various types of aero engines—the carburetor has been made fireproof. To quote the firm's own description, "The float chamber is wholly enclosed and airtight except for an overflow and vent pipe of very small bore. The intake passage is continued in the shape of a long pipe, so that should the engine 'blow back' the flame would be muffled. So also is the extra air-pipe similarly muffled and gauze covered."

Lubrication is by Bosch lubricator driven by helical gearing from the crankshaft. Two piston pumps, one a piston valve and the other a positive pump, are actuated by cam-shaped discs. The pressure obtainable is about 1,000 pounds to the square inch. The oil leads are of weldless steel tubing and are arranged neatly outside the engine. Thus any repairs can be made readily and quickly.

The throw of these pumps can be regulated in a simple manner by moving in or out a series of screws placed round the rim of the filling up orifice.

The oil consumption is one-half gallon per hour; the gas consumption, about 8 gallons per hour. Copper jackets are electrically deposited on the cylinders. The motor is equipped with push-button and battery starter. The motor develops 90 H. P. at 1,300 revolutions.

A BLERIOT STABILISER.

Perreyon has been testing a Buc a Blériot machine fitted with a new stabilizer invented by M. Blériot. The apparatus principally consists of a weight attached to an extension of the *cloche*, and in its trials it seems to have worked perfectly. In one flight, Perreyon took up M. Rene Quinton, and flew round and round for a quarter of an hour without touching the *cloche*, his arms, in fact, remaining folded.

I like to have your magazine till I stop you from sending it.—*V. M. K., New Jersey.*

WHY ROTATIVE MOTORS HAVE ODD NUMBER CYLINDERS.

L. Lecornu has told succinctly why rotative motors have an odd number of cylinders. "The reply is given through the formula which I had occasion to prove, and which may be stated as follows: n=K (+p—2) where "n" is the number of cylinders, "K" the number of cranks, and "p" the order in which the sparking occurs; that is, after having sparked the first cylinder, then the one of rank, p+1, is sparked, then 2p+1, and so on until the first one is reached again. In order that all the cylinders may be sparked in turn it is necessary and sufficient that "p" is prime with "n." That granted, it follows that, if one crank is employed in order to simplify and make the motor as light as possible, "k" must equal "1" and when p=2, "n" must be odd.

NEW BOOKS RECEIVED.

THE CURTISS FLYING BOAT is the title of a brochure gotten out by the Curtiss Aeroplane Co., of Hammondsport, N. Y., which deals with the pleasures of aerial aquatics and is from the pen of Lyman J. Seely, although he doesn't say so. It's a beautifully gotten up booklet, immensely practical, absorbingly interesting and enough to almost make an aero editor buy.

THE DUNNE MACHINE IN AMERICA.

For a number of years W. Starling Burgess, together with everyone engaged in the development of aviation, has watched with the greatest interest the development of Lieutenant Dunne's experiments. The many accidents during the last year on machines generally recognized as the safest yet built has caused the general public and many intimately interested in aviation to well-nigh despair of attaining the long wished for safety in flight.

The commercial development of the aeroplane depends upon the production of a flying machine that is inherently stable. It is not too much to say that little or nothing has been accomplished either in this country or France towards this end during the last three years. That mechanical devices for the operation of wings and rudders, however perfect, cannot be considered as solving the problem, is claimed by adherents of inherent stability.

Like almost every great inventor Lieutenant Dunne has worked alone with little or no encouragement from those already interested in the art of flying to a point where his success could not be further overlooked. The flight of Commander Felix, so fully reported in AERONAUTICS and the American press, marked the debut before the world of the first inherently stable aeroplane.

Not only private individuals but the military aviation experts in both England and France became interested at once. Before the mails bringing the details of the new aeroplane could arrive the Nieuport Company, one of the most progressive in France, had obtained not only a license to build the Dunne machine in France, but also an order from the Government for the construction of four Dunne aeroplanes to be delivered at the earliest possible moment. The English Government, which up to this time had looked upon the Dunne machine merely as an undeveloped possibility, hastened to place their order for three machines for immediate delivery and thus tardily recognized Dunne's great achievement.

Mr. Burgess went abroad for the sole purpose of thoroughly investigating the latest developments in Lieutenant Dunne's work. He was both surprised and delighted to find that Lieutenant Dunne was already fully acquainted with his own success as a designer of aeroplanes as well as of yachts.

London "Engineering," the leading technical paper of the world, in its issue of October 3 devoted its supplement and principal pages to a detailed description with photographs and drawings of the three latest and most successful Burgess aeroplanes—the Burgess Tractor, the Burgess Coast Defence Hydroaeroplane, and the Burgess Flying Boat, all now in active service in our Army and Navy.

Under these favorable conditions a contract giving Mr. Burgess the sole license to manufacture under the Dunne patents was easily arranged. Investigation of these patents reveals the fact that Lieutenant Dunne has very carefully protected in them the basic principles of his method of inherent stability, and that they can be easily defended from infringement.

"With its advent in America the many disputed questions of the easiest method of control, whether by wheel or by levers, whether by ailerons or by warping wings, lose their importance. The Dunne aeroplane is inherently stable, but two levers are used and these are used simply for guiding up or down, or to the right or left. The machine cannot tip over either laterally or fore or aft."

Of course one can appreciate the enthusiasm which Commander Felix has so well described when he first realized that he could remove his hands from the levers and allow his machine to fly alone over the waters of the English channel while he spread out before him his mid-day lunch.

The Dunne machine is not an easy aeroplane to construct. Its principles of balance depend upon a very careful co-ordination of varying wing curvatures from center to tip. Lieutenant Dunne has supplied Mr. Burgess with the fullest drawings, patterns and templets and the first American Dunne is now under construction. Mr. Burgess is now designing the hydroplanes for the new machine, for it has not yet been equipped to fly over the water. This involves serious engineering problems, as the machine arises and alights in a very different manner from the older types of aeroplanes.

Mr. Burgess' work therefore will be watched most carefully by the thousands interested in aviation who are waiting for the day to arrive when they can take up the art themselves with an assurance that in doing so they are not entering an unduly hazardous sport or occupation.

The advent of the Dunne machine in America under Mr. Burgess' skillful guidance marks a great step in the development of American aviation.

AEROPLANE TO SPEED UP WARFARE.

"An all-around speeding up" of strategic operations may be expected in wars where aeroplanes are used is the opinion expressed by Major F. H. Sykes, Commandant, Military Wing, Royal Flying Corps, of England, and the plans drawn out previously in peace will require greater care in order that the preliminary dispositions of troops may be the best possible; yet, "the old, old principles prevail" in warfare and in any case "no revolution of methods will occur."

Citing instances from the battles of recent and not so recent history, Major Sykes went on to tell The Aeronautical Society of Great Britain at a recent meeting that, due to the use of aircraft, "the sequence, order, counter-order and disorder should be less frequent. If the huge masses of modern armies are found to have been wrongly placed, no amount of zeal, training, bravery, or mobility can make up. There will be no time for a general re-shuffling. The offensive will increase in advantage over the defensive. Leaders must

be prompt and correct in decision; troops prepared to make long and rapid movements."

Certain things being equal, the greatest number will win. General Jackson, by small, mobile daring forces, by rapid hidden movements was sometimes able to defeat considerably larger numbers. "Aircraft will, I think, render this line of action impossible," says the Major.

That war is impossible without command of the air, he thinks is a statement which should refer possibly to wars of a few years hence. Further, he says: "I even hold that command of the air can never really be of the same nature as command of the sea. Neither can the same extent of strategical or tactical freedom in the area of operations be obtained, which might result from the vigorous use of good cavalry.

"At sea and on land there are only two dimensions. In the air the third, climbing, is the difficulty. It may be overcome" with time and further progress but this third dimension is a "severe stumbling block." A heavy machine, perhaps, with guns and ammunition and armor, would be a slow climber and difficult to land easily and safely. "For the time being it would certainly seem that the fast scouting machine will have various advantages over the heavier type." Then, if both sides use it, each will know a pretty good lot about what the other is doing. "If both sides have fighting machines, the side upon which this fact has the least moral effect will have an important advantage. A little fighting in the air will, I think, have a far-reaching deterrent effect on the moral of the aerial forces of the losing side."

Aeroplanes will save cavalry much unnecessary work. A general in three and a half hours can report the enemy's strength, position, etc., if within an 80-mile radius. "The reports of aircraft will afford a degree of security, a saving of officers, men and horseflesh, in anxiety and strain on the commander, in mental wear and tear of the infantry and artillery." Fog and night will prevent aerial reconnaissance and, owing to the speed, the field of observation will not be very detailed; and small bodies of men will learn to quickly hide.

It will be difficult to recognize opposing aircraft, or any at all from the ground. A reduction in number of types is suggested as an aid to recognition, and tables of types of friend and foe will have to be issued to troops.

THE TURNER "AVIAPHONE."

Mr. K. M. Turner, who has been a close follower of aeronautics for several years, developed his aviaphone originally for the U. S. Army Aeronautics Corps to facilitate and make more effective aerial reconnaissances.

The device, which is an adaptation to aeronautics of Mr. Turner's famous "Dictograph-Turner" interconversing system, was worked up to its present state of efficiency in co-operation with a number of the Army aviation experts, at the Government grounds in Augusta, Ga., and also at Hempstead, Long Island, where its utility and value was demonstrated in a number of very exacting tests.

As is well known, the noise of the engine has long made it difficult for the observation officer in any heavier than air craft to freely communicate with the operator of the machine. Army officers have recognized this as a serious handicap to the operation of the machine and its mobility in action, where seconds are too precious to be wasted.

The Aviaphone consists of a powerful transmitter with a tube projecting upward from it, permanently attached to each man in the machine, connected by wire with a set of pow-

erful earpieces permanently affixed to the head, by means of a headband. The transmitter is attached to each man by means of a light harness and is arranged so that by bending his head slightly downward, his mouth is directly in front of the tube. This enables him to talk freely into it and keeps both hands free at all times, he having nothing to handle in the use or operation of the system. The wire connecting the transmitter with the earpieces of the other man in the machine is so arranged that in the event of the latter falling from the machine, the wire is instantly disconnected and the second man prevented from being carried down with his companion.

At the same time that the transmitter of the aviaphone magnifies sound several hundred per cent., it also clarifies sound, providing perfect articulation. The earpieces rest on rubber cushions and while held so firmly against the ears that no outside sounds can intrude, the pressure of continuous use causes the user no annoyance. The batteries for the operation of the instrument can be stowed on the person of either one of the men, being so small that they fit easily into a pocket. They register less than three volts and about twenty amperes.

The experiments made of the device by Army officers and also by lay-aviators, both amateur and professional, have been so highly successful, that Mr. Turner is confident that the aviaphone will soon become a necessary and indispensable appointment of every air craft.

KNABENSHUE DIRIGIBLE.

The only dirigible known to be operating in this country is now the new big ship of Roy Knabenshue, who has gone back to the gas bag after dallying with the aeroplane as an exhibition contractor.

The car has a capacity of ten persons, and has taken up 132 people for trips of 3 to 15 miles from and back to the aerodrome at Pasadena at a speed of 30 miles an hour, with but a 30 h. p. motor.

The bag is 150 ft. long, 2,000 cubic metres capacity, Hansen motor. The propellers are Wright type.

The ship is of non-rigid type, with a rectangular (cross section) framework below running the entire length of the bag. The elevating rudders are at the rear, and behind them are the six vertical rudders. The motor drives two propellers, one at either side of the framework at the end of triangular braces, driven by chain. Twenty trips were made from Sept. 20 to October 16 (20 days) with a total duration of 6 hours 31 minutes.

CURTISS O-X MOTORS COMPARED.

With the weight of the remodeled 75-80 h. p. Curtiss motor increased by a few pounds, new valve action and increased bearing surfaces bringing the net total up to 320 pounds, and the gross total ready for a run of four hours, including gasoline, oil, radiator, water, etc., up to 638 pounds in producing the 90-100 h. p. O-X motor of the same bore and stroke, the O-X shows real lightness. Here is a comparative table, the figures taken from a European publication:

"In the table below a net delivered horsepower of 85 is claimed for the 100 h. p. Gnome, the same for the O-X Curtiss and 72 for the 70 h. p. Renault. Weights for the Gnome and Renault motor fuel, etc., I have taken from the foreign publication referred to; those for the Curtiss O-X were supplied by Lieut. B. L. Smith, U. S. N., who had compiled the data from his Navy machine for his own information." At 1,800 r.p.m., the O-X shows 106 6 h. p.

THE FLYING BOAT AS A DEPENDABLE VEHICLE.

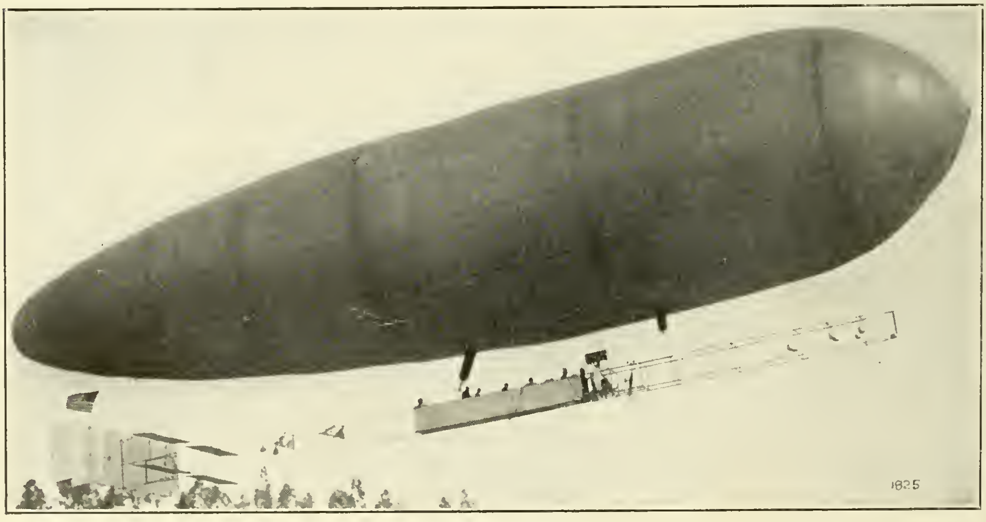
Raymond V. Morris, who acted during the summer and fall as pilot for Gerald Hanley of Providence, has kept a daily record of his season's flying with the Curtiss boat. His book shows a total of more than 110 flying hours, approximately 6,000 miles, with but one overhauling. Broke one rod.

C. C. Witmer, in charge of Harold F. McCormick's flying boat, has flown approximately 5,000 miles, with one overhauling of the motor. No breakage.

L. A. Vilas kept a partial record of his summer's flying from June to October, and he estimates that he flew more than 3,500 miles. So far he has not had occasion to drop the lower half of the crankcase. The motor has not been overhauled since it left the factory. No breakage.

J. A. D. McCurdy, in charge of George von Utassy's flying boat, flew every fair day from mid-July to mid-October. Estimated mileage 5,oco. Broke one bearing cap.

MOTOR	WEIGHT Net	GALS. GAS Per Hour	GALS. OIL Per Hour	FUEL WT. Four Hours	TOTAL WT. Motor and Fuel	WT. PER H.P. For 4 Hours
100 Gnome	308.64	12.1675	2.7	377.76 lbs.	686.4 lbs.	8.07 lbs.
70 Renault	462.966	9.26	.79	246.03 "	709. "	9.946 "
90-100 Curtiss	430.	8.	.5	208. "	638. "	7.505 "



Knabenshue Dirigible

MAXIMOTOR: LATEST 100-HORSE-POWER MOTOR.

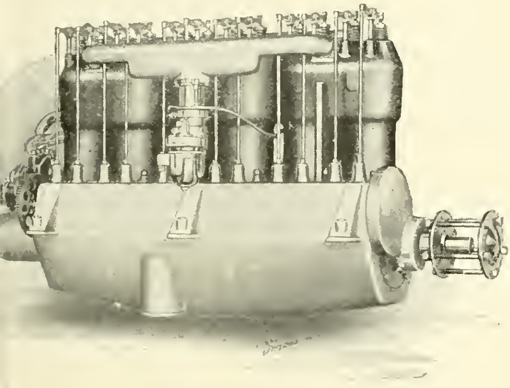
The ever-increasing popularity of the flying-boat brought with it the necessity of larger-powered motors. Maximotor makers have kept step with this demand and the new powerful 100-horsepower Maximotor is the result.

A brief description will give the reader a good idea of how Maximotors are built up, from materials mostly imported from England and Germany; also showing a good many points of refinement in mechanical construction not found in other American aeronautic motors.

To begin with, the cylinders are of the overhead valve type cast in pairs from vanadium gray iron containing 30 per cent. steel.

Casting the cylinder in pairs has the advantage of producing a more compact power plant, giving them united strength and reducing the manifold joints. The piston also is cast from the same material, heavily ribbed at the head and machined both inside and outside, allowing equal expansion.

All the valves are located in the head and mechanically operated.



Maximotor, 100 H. P.

The crank shaft is cut out of a solid billet of imported chrome nickel steel, double heat treated, thereby producing a very high tensile strength, machined, hollow bored, and ground to size within one thousandth of an inch.

Imported ball-bearings are employed on all main crank-shaft bearings, which are five in number. The propeller-end of crank-shaft is unusually rigidly supported; two extra heavy annular ball-bearings are employed to carry the load as well as thrust, and are mounted in a vanadium steel housing which, in turn, is recessed and bolted to the crank-case proper by six nickel steel studs.

The crank-case is in one casting from a special aluminum alloy, eliminating a good many joints and bolts; which feature is most essential in an aeronautic power plant.

The connecting rods are drop-forgings of chrome nickel steel, double heat treated, to give extra strength and allowing them to be made very light.

The cam-shaft is of nickel steel tubing; the cams of special high carbon steel tempered, ground and held in place by taper pins.

The oiling system is mechanical by a small rotary pump placed in the oil-sump in bottom of crank-case.

A double oiling, carburetor, and ignition system can be arranged if especially desired.

In a three hours' test by a hydro-dynamometer the motor showed in excess of 100 horsepower at 1,350 r.p.m., consuming 8½ gallons of fuel and 7 pints of lubricating oil per hour. On the testing stand, for propeller test, the motor pulled from 625 to 650 pounds thrust, turning a two-bladed propeller, with a diameter of 8 feet and a perimeter of 6 feet, at from 1,350 to 1,400 r.p.m. The weight is approximately 375 pounds exclusive of radiator and propeller.

The Maximotor makers are prepared to make prompt delivery on the following sizes of motors: Model "A": 4 cylinders, 40-50 horsepower; Model "B": 4 cylinders, 60-70 horsepower; Model "C": 6 cylinders, 70-80 horsepower; Model "D": 6 cylinders, 90-100 horsepower.

THE 6-CYLINDER 60-HORSEPOWER WRIGHT MOTOR.

Ever since the first motor that flew the first aeroplane was developed in 1903 by the Wright brothers, the development of the Wright motor has steadily continued. The basic principle adopted in those early days to develop a power plant that combined efficiency, reliability, lightness, strength and simplicity, has been adhered to with remarkable perseverance. In 1908, when public flying first began, the world was astonished to find the Wright 4-cylinder 40-horsepower motor a more reliable and more efficient aeroplane engine than any that had been previously developed by acknowledged experts in gasoline engine work.

Several automobile firms abroad in 1908 and 1909 took to perfecting the Wright 4-cylinder engine for use on the foreign Wright machines, and the fact remains that not a single one equalled in general adaptability combined with lightness, reliability and strength, the genuine Wright motor, manufactured in Dayton.

It is needless to dwell upon the marvellous feats that have been performed with the Wright 4-cylinder engine. Since 1908, when it was first publicly flown by the Wright brothers, their product has remained to this day a standard exponent of reliability and good service.

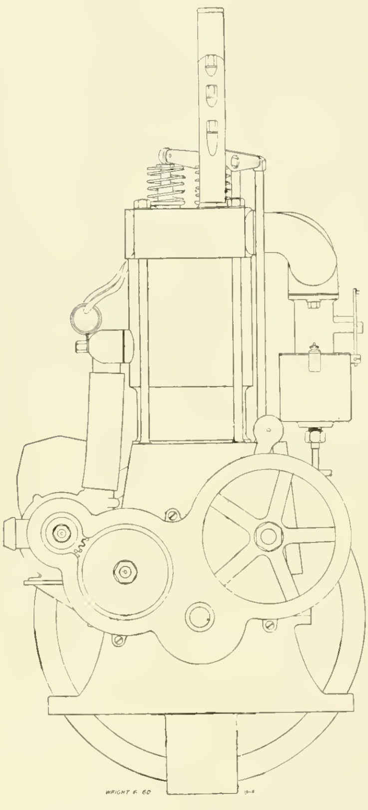
The necessity for greater power, particularly in heavy scouting military machines and in aeroboat work, led the Wright Company to consider a more powerful engine, and for over two years steady development work has been done on a 6-cylinder engine of larger stroke than the four, and replete with improvements in detail. This new 6-cylinder engine, called type "6-60" has lately reached the completion of its development stage and the Wright Company are now prepared to make deliveries on the new engine.

In general the appearance of the motor is very compact. Its projected area on the plane is small, making its air resistance low. Accessibility of all parts is apparent on first glance. There are an unusually small number of parts that can get out of order.

The magneto, pump and oiler are all driven from the crank shaft, through gears on the end of the motor at 1½ engine speed. All the gears, water pump, oil pump and magneto connections are in the open, accessible and easy of inspection. The pump, oiler and magneto are all placed on a shelf, integral with the crank case on the exhaust side of the motor

On the opposite side is the cam shaft, also driven by gears, all enclosed with the pump and magneto gearing in one gear case.

The new "6-60" has not been developed for



the use of specialists, but on the contrary it is adaptable to the most general aeroplane practice, to motor boats, or to any apparatus requiring a light, compact, reliable gas engine power plant. No special oil or gasoline is required for its operation, and in its construction there is an entire absence of complication which would in any way render replacement difficult.

Ignition is by a "Mea" high-tension magneto. Provisions for two sets of plugs are made in the cylinder heads, and either a single or dual system of ignition can be used. If it is not desired to use a dual system the plugs are either left unwired or replaced by a blank stud, or pet cocks for priming in cold weather. Provision is also made for fitting water-tight caps on the plugs. A 60-degree rotation of the magneto is obtained, giving retardation necessary for safe cranking.

A gear pump driven by worm from the pump and magneto shaft forces the oil from the well in the crank case to the distribution points. A splash system is used, with lips on the ends of the connecting rods. Throughout the engine grease cups are fitted, in simple and accessible manner.

Two "Zenith" carburetters of ample size, each feeding 3 cylinders, are mounted in a very neat manner on the intake manifold. The intake air-vents of the carburreters being close to the cylinder walls and receiving hot air from around the cylinders. The two control levers are joined by a rod and locked turnbuckle fitting. The "Zenith" carburreter is remarkably simple and effective, and will operate perfectly on the lowest to the highest speeds on practically any grade of fuel. It is not affected by altitude. There are no springs to weaken, no valves to bind or get dirty, and no pistons to get loose. The construction of the spray nozzle is such that the motor receives a constant mixture at all speeds.

As in all previous Wright aeroplane motors, a water cooling system is used. On the same shaft used for the magneto drive is mounted a centrifugal pump, 3¼ inches in diameter, which, like the magneto, runs at 1½ times the engine speed, and which delivers a high-pressure flow of water directly to the intake manifold on the base of the cylinder and cylinder heads, cooling the valve and spark plug regions and passing out through the manifold above to the radiator. A T-bolt construction is used for fixing the manifold to the cylinders and for aeroplane work it has been found exceedingly simple and reliable. By a convenient arrangement of the bolts the water flow is restricted in a uniform manner so that it delivers an equal amount to all cylinders and insures the uniform cooling of the entire motor. The water jackets on the new "6-60" consist of Bessemer steel, seamless, tubing, shrunk on with a .005 inch shrinkage, with ample shoulder for bearing surface and plenty of stock to insure water tightness. The cylinder head is screwed into the cylinders and the jacket shrunk on, after which the entire cylinder is tested out by a water pressure test.

The one-piece crank shaft on the "6-60" is made of crucible chrome nickel auto steel. The steel is first drop-forged and roughed out, and after a special heat treatment the bearings are ground to exact size.

The cylinders cast separately, with their novel heads and their remarkable strength and lightness, are made of a light, medium grade of cast iron of fine grain, uniform structure, low in sulphur, avoiding brittleness, and medium in silicon, which gives softness enough for perfect machining. The iron is high enough in manganese to produce a splendid wearing surface, and the casting is, throughout, light in

structure, well-proportioned, and splendidly designed to avoid casting strains. The cylinder heads are made of medium gray iron of the same composition.

The cylinder head is screwed onto the cylinder and, as previously described, the water jacket is fitted and the whole tested for water tightness. Then the cylinders are again set in a lathe and bored to exact size. This method of treatment insures absolutely perfect alignment of the cylinder walls as it relieves all strains due to shrinking of the jacket.

To avoid the possibility of pitting, cast iron valves are adopted. The valve is made with a chrome nickel steel stem; screwed into a gray cast iron head with a fine thread. The stem is riveted to the head, after which the valve is centered and machined to a finished size.

The valve springs are made of a specially drawn Vanadium steel wire. The springs are rolled and ground on the ends, after which they are heated and in tests show a pull of 38½ pounds per inch. The breaking of a valve spring is practically rendered impossible.

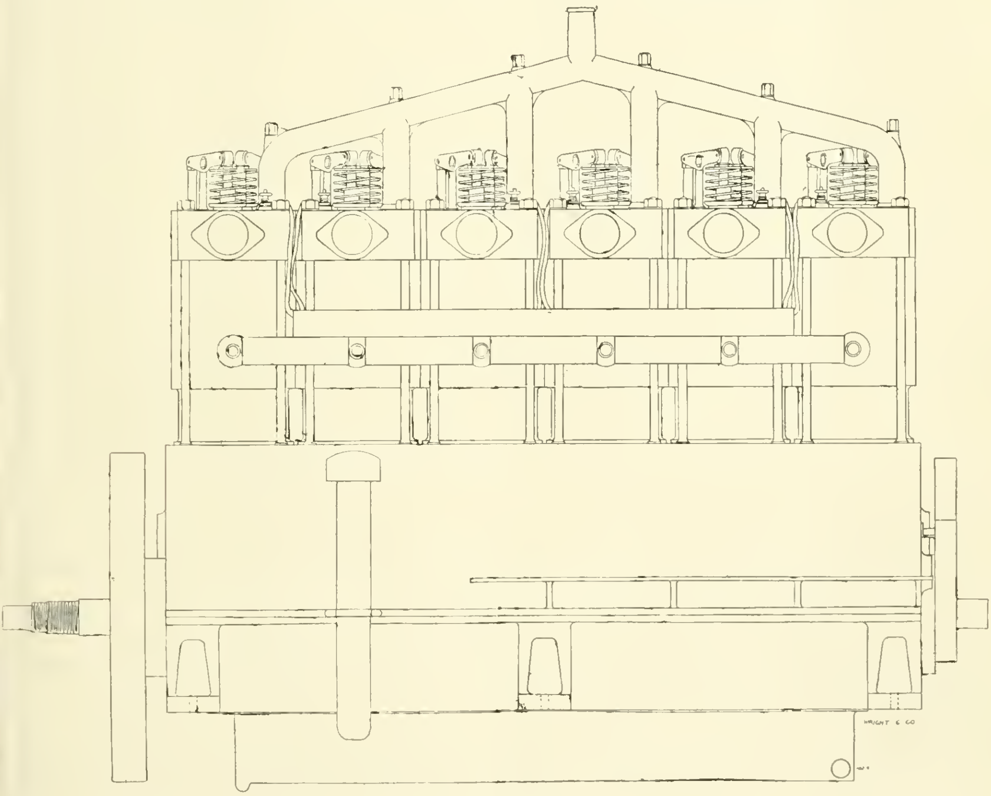
The rocker arms, fitted with rollers on the end, are made in a simple manner of high grade steel plate, carrying a plug fitting into the push rod tube in a manner which permits of exceedingly simple adjustment by the manufacturer, but one which can in no way work loose or be tampered with when the motor is in use. However, any necessary adjustment is always easily made by adding or reducing the number of small washers between the end of the push rods and the base of the stem on the rocker arm. The valves are unusually large and are all mechanically operated.

The pistons are made of a very fine grade of gray iron, low in sulphur, carefully machined and of generous proportions. The piston rings are also made of gray iron of a special casting, which insures springiness to the ring. The piston pin is made of Shelby tubing, machined to .010 of an inch. The pin is then heat-treated and carbonized after which it is ground to size. The connecting rod of "H" column cross section is a drop-forging of high grade machine steel. Bronze bearings are used on the piston end of the connecting rod.

For general use the fly wheel is fitted to the engine, as is also the ingenious Wright valve release rod, which, by merely pushing with one hand at once opens all the valves of the engine.

The Wright "6-60" engine weighs 305 pounds complete, and although rated at 60 horsepower, develops at its high speed considerably more than this. The speed of the engine can be varied at will between the limits of 1500 and 600 r.p.m. without affecting the smoothness of its running.

A muffler and cut-out may be fitted, on order, for which an extra charge is made.



Wright 6-60 Engine

BEACHEY'S LOOP MACHINE.

The machine which Lincoln Beachey is using in his loop-the-loop stunts is a special Curtiss built by him and James LaMont at the Curtiss factory. There are really few changes over the standard Model D Curtiss land machine, details of which have heretofore appeared in AERONAUTICS. The engine is a Curtiss of 90-100 horsepower.

The whole machine is heavily wired, the plane sections with 3/32-inch Roebling wire, and doubled in parts as usual. The front and rear lateral spars are double-heavy, about 1½ inch by 3 inches, and a trailing edge has been replaced. The wings spread 24 feet 3 inches over all, built in three sections each, 9 feet x 6 feet 3 inches x 9 feet. The separation between planes is 5 feet 6 inches. The tail outriggers are 2 feet shorter than usual and there is no fixed stabilizing plane at all save one, 6 inches at widest part, in center, tapering to 2 inches at either side to which the elevators are attached, the latter having been increased slightly fore and aft to give more surface. The front wheel is brought in about 2 feet and the pilot sits almost over it. The rear wheels have been set slightly further forward and the planes are closer to the ground than normally due to shortening of rear wheel braces, forks and front "V," the top plane being only 7 feet from the ground.

A belt comes from the bottom of the seat and up over Beachey's lap to hold him in while upside down, this strap being set loose instantly by pulling out a pin or key. In addition, there is a shoulder strap. The machine weighs, unloaded, 901 pounds.

On November 18, at Los Angeles, Lincoln Beachey celebrated his return to flying by flying upside down, and later looped the loop with a specially built and braced miniature Curtiss biplane. Pegoud is touring Europe giving exhibitions, Chevillard has done the loop with a Farman biplane, and others are copying the feat in various parts of the world.

REVOLVING CYLINDER MOTORS.

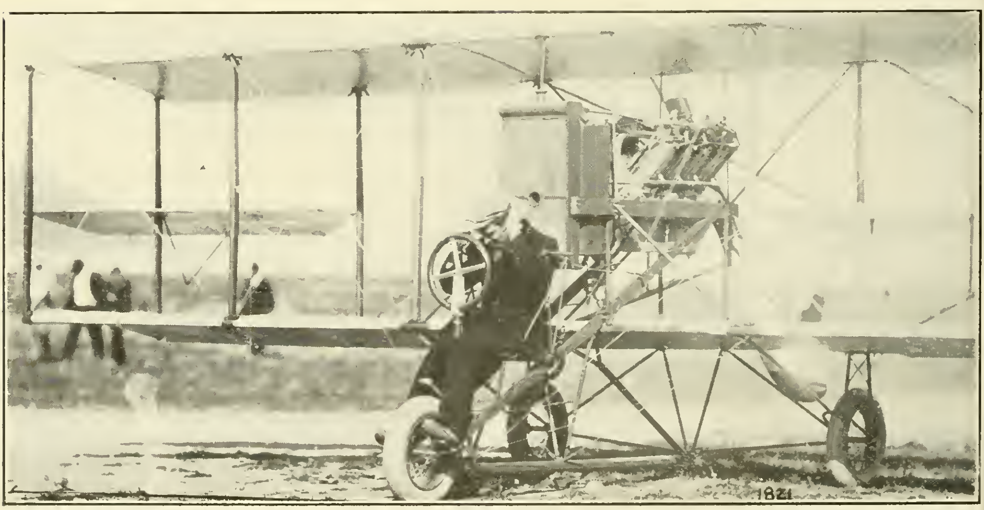
[Continued from page 171]

the amount of oil used through oil shields as it is well known that a large amount escapes through the intake and exhaust valves through centrifugal pressure.

As to gyroscopic effect—all aviators who have flown with both reciprocating and rotary motors state they would never go back to the reciprocating kind.

It is astonishing to see a Wright machine, fitted with a rotary motor, fly. It is a different machine. It will rise from the ground almost like a helicopter. It will have a lifting power for ballast three times of one with a Wright motor. It is quite a revelation to see that combination of a splendidly designed lifting machine as the Wright always has been economical in power, when a first class rotary motor is hitched to it. The chains are seen to run straight like ribbons, showing the lack of vibration. There is very little vibration on the plane with a rotary motor. We test our Gyros on a very lightly constructed "wind wagon," but while you can feel some vibration when touching the wooden supports you could not see them move.

Some experiments have been made using graphite instead of oil. We have tried something along this line, with the graphite suspended in the gasoline. We tried it the other day with 76 gasoline to see whether it would stay in suspension as well as it does with 65 gas. We found it would not keep suspended any length of time but it took but very little vibration to keep it suspended and we rather think that even the slight vibration of the motor will suffice on future tests. This idea was given to us by Captain A. T. Lucas, of Washington, D. C., who found that artificial graphite had sufficient lightness for permitting this system of lubrication to the exclusion of oil. But whether the motor would develop as much power is somewhat questionable as the "sealing" property of oil would be lacking.



DESIGN FOR A SELF-RISING MODEL

By HARRY SCHULTZ, Model Editor.

The accompanying drawing shows a design for a self-rising model. Models of this type are much in use in England, where this tail-behind type first originated. This model is designed for flying in windy weather and ought to be just the thing for this time of the year.

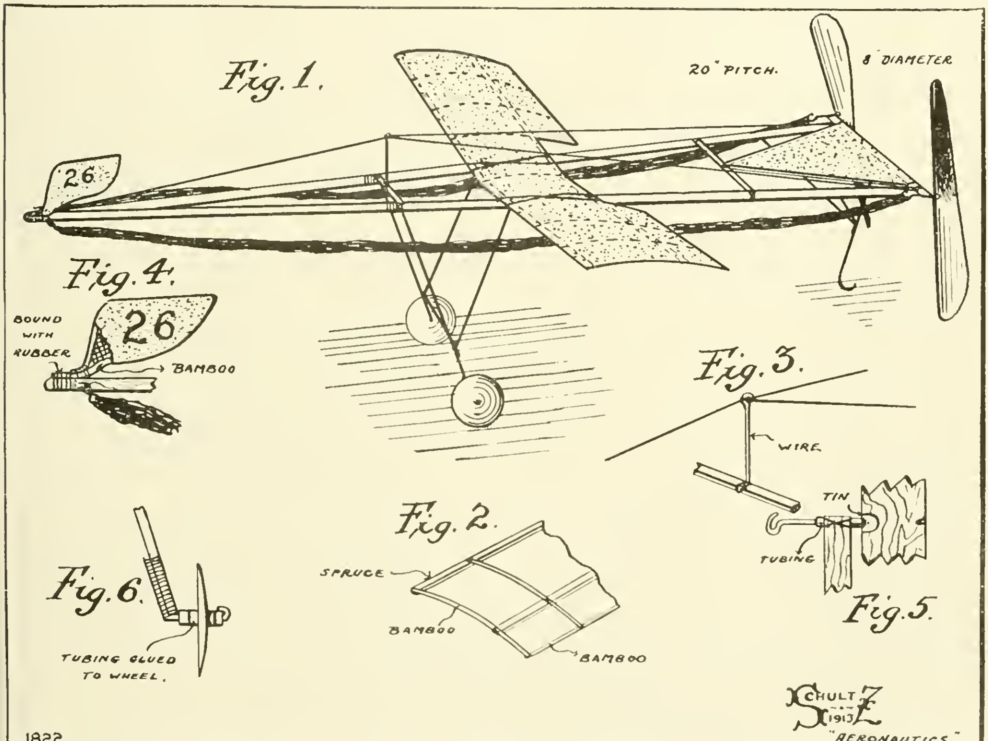
The fuselage consists of two strips of silver spruce, ¼ in. by 3/16 in. at the center, tapering slightly towards the ends and out to a stream line form. The frame is bound at the front, fitted with the usual hooks, and glued.

Running across the frame 12 in. from the apex is a bamboo brace, 3/16 in. wide, out to stream-line form, and extending upright from this brace is a 2½ in. piece of 1/16 in. piano wire, fitted with a loop at the top through which extend bracing wires as shown. The construction is clearly shown in Figs. 1 and 3. The rear brace of the frame, or propeller-bar, is of bamboo, ¼ in. wide by ⅛ in. in thickness, out to stream-line form, and 12 in. from this rear brace is another brace of bamboo, and extending from this brace to the rear brace are diagonal strips of bamboo, this space being filled in with fabric to form the tail.

The main planes measure 24 in. span, with a chord of 4½ in. at the ends, extending in for 8 in. The entering edge and main beam of the plane is of 3/16 in. wide by 1/16 in. spruce, cut to stream line form and the trailing edge is of ⅛ in. square bamboo. The plane and tail is covered on top with silk treated with Ambroid varnish. The fin is constructed of a single piece of bamboo, and is 2½ in. high and 3½ in. long. Fig 4 shows the construction of the same.

The propellers are cut from a solid block of white pine, and are 8 in. in diameter, with a pitch of 20 in. They are given a coat of white shellac.

The bearings consist of ½ in. lengths of tubing, bound and glued to each end of the propeller bar. Bent around the propellers at the hub are small strips of tin as shown in Fig. 5.



The chassis or running gear is made of 1/16 in. flat steel wire, the rear skid being 5 in. long and the front chassis, including the wheels, being 10 in. high. The wheels are of laminated wood, fitted with small pieces of tubing for bearings as shown in Fig. 6.

The motors consist of 12 strands of ⅛ in. flat rubber for each propeller.

The Long Island Model Aero Club is one of the foremost organizations of its kind in America. The membership of this club is steadily increasing and at the present time there are over twenty-five members on the books of the club. Model flying contests are held every Saturday afternoon at Van Cortlandt Park under the auspices of The Yonkers Model Aeroplane Association between 3 and 5 P. M. Official Mr. Edward Durant.

MODEL FLYING IN ENGLAND.

Those who have kept close watch on the progress of model flying are aware that there is great activity on the other side of the Atlantic. Throughout England there are over fifteen model aero clubs, many of them having workshops, private flying grounds, man-carrying gliders and many members.

All records that the American model flyers could boast of as being World's records are gradually being swept away by the fine flying of our English cousins. For instance, our rise-off-ground duration record is 81 seconds, while the English record for this branch of flying is 169 seconds by Mr. J. E. Louch. Mr. J. E. Louch is one of the foremost model flyers in Great Britain and is the holder of the record for hand launched tractor models, 45 seconds.

Another famous English flyer is Mr. L. H. Slatter, who holds the records for distance, R. O. G. models, 365 yards, single screw hydro, 35 seconds, twin screw hydro, 45 seconds.

The French model flyers take a more serious view of model flying than is taken in this country. Their models are mostly large scale models or scientific models equipped with carbonic acid gas motors, compressed air or miniature gasoline motors.

From the above it will be seen that if the American model flyers desire to retain "World's Records" in this country, they must "put their best foot forward" at once in that direction.

The following is a statement of the world's records as they stand today:

Distance, hand launched, Arthur Nealey (American), 2,740 ft.

Duration, hand launched, W. L. Butler (American), 170 seconds.

Distance, R. O. G., L. Bamberger (American), 1,542 ft.

Duration, R. O. G., J. E. Louch (English), 169 seconds.

Hydroaeroplane, Geo. E. Cavanagh (American), 60 2/5 seconds.

Single screw tractor, hand launched, distance, C. C. Dutton (English), 798 ft.

Single screw tractor, R. O. G., distance, C. C. Dutton (English), 590 ft.

TRYING A GYROSCOPE STABILIZER.

Army and navy fliers have about concluded a busy season of study and experiment at the Curtiss camp and factory at Hammondsport, N. Y. Lieut. P. N. L. Bellinger made hundreds of flights while trying out a gyroscope stabilizer, flying on one occasion "from Hammondsport to Penn Yan and return, a distance of about 40 miles, without using the manual controls." He is now on duty at Annapolis. Lieut. Richardson, N. C., who spent the summer at Hammondsport observing trials of new machines and studying flying boat construction, is now on duty at Washington where he is conducting a series of tank experiments on hydroplane models. Lieut. B. L. Smith, M. C., is still at Hammondsport flying the Curtiss batboat A-2 and watching the construction of the navy's new fleet of flyingboats Lieut. W. R. Taliaferro, U. S. A., and Lieut. J. E. Carberry, U. S. A., who have been studying motor and aeroplane construction at the Curtiss factory, leave December 1st.

I always look forward to the coming of your paper with great interest, and want to congratulate you on the big up-hill fight which you are making in the service of aerial navigation in the United States.—C. L. L., Paris.

AERONAUTICS

Published Monthly by Aeronautics Press

122 E. 25th St., New York
Cable: AERONAUTIC, New York
'Phone, 9122 Madison Sq.

A. V. JONES, Pres't — ERNEST L. JONES, Treas'r-Sec'y
ERNEST L. JONES, Editor — M. B. SELLERS, Technical Editor
HARRY SCHULTZ, Model Editor

SUBSCRIPTION RATES
United States, $3.00 — Foreign, $3.50

No. 75 NOVEMBER, 1913 Vol. XIII, No. 5

Entered as second-class matter September 22, 1908, at the Postoffice, New York, under the Act of March 3, 1879.

¶ AERONAUTICS is issued on the 30th of each Month. All copy must be received by the 20th. Advertising pages close on the 25th.

¶ Make all checks or money orders free of exchange and payable to AERONAUTICS. Do not send currency. No foreign stamps accepted.

News In General

Panama-Pacific Meet.

The first meet of the Panama-Pacific Exposition flyers took place Nov. 16 on the Exposition Grounds, and was distinctive in that all machines participating were hydros or flying boats. It was a great success, notwithstanding the one or two mishaps which occurred. The following Sunday Roy Francisco, Frank Bryant and William Blakeley were added to the list of machines flying, those of Fowler, Christofferson, Sutro, Rybitski. A prettier sight cannot be imagined than five hydroaeroplanes in the air at one time. Sutro's mishap cost the loss of his machine, as the boats towing the submerged hydro to shore broke it up considerably. He was endeavoring to make a turn with a passenger too close to the water and dug a wing tip in the water.

Hall-Scott equipment is used in all the machines flying at the Exposition Grounds so far.

The meet was held under the direction of the Pacific Aero Club. The six 'planes raced around Alcatraz Island, through the Golden Gate and back and forth over the fair grounds. The flights were all exhibition, and no times were officially recorded.

Similar aviation meets will be held every Sunday and holiday throughout the winter. Three more aviators, Glenn Martin, Frank Bryant and Miss Siedel, a pupil of Martin's, will fly beginning next Sunday.

For Flying Boat Builders.

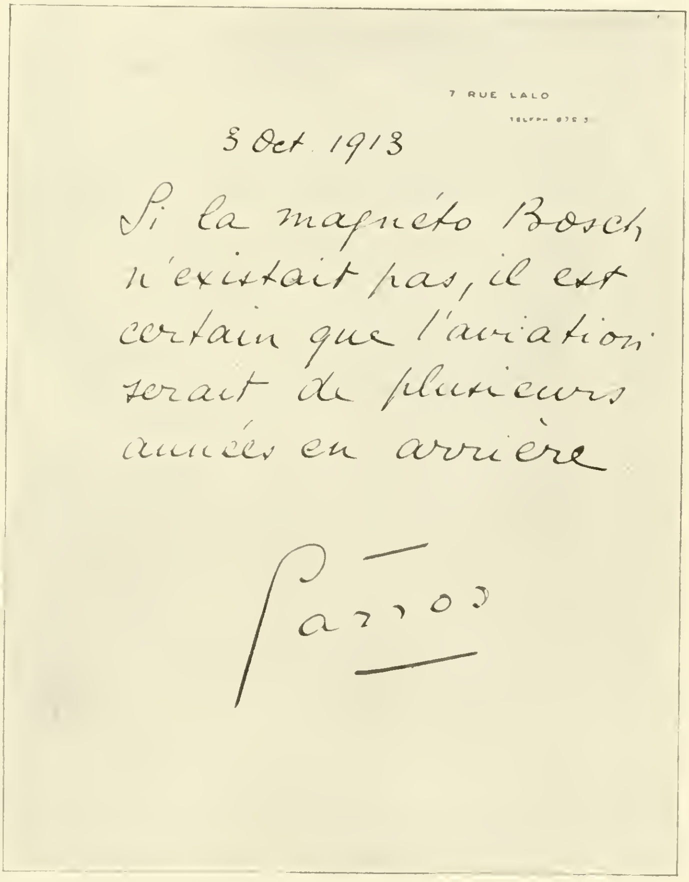
L. W. Ferdinand & Co. have received the following testimonial to the excellence of their glue from Hugh Robinson:

"I wish to say that I have always used your Jeffrey's Marine Glue in the construction of motor boats, etc., and have never been able to find another glue which would give the entire satisfaction that it does. In the construction of the hull of the Benoist Flying Boats, which I designed and built, I always use Jeffrey's Marine Glue exclusively and they are a marvel of strength and lightness and never leak or take water in the least."

Air Pilots' Club.

Licensed pilots living at Los Angeles have organized the Air Pilots' Club, with George B. Harrison president; Roy Knabenshue, vice-president; Charles F. Willard, secretary. Walter Brookins, Glenn Martin, Beryl Williams, Harry Holmes and others in Southern California are also members. The hope is to eventually organize all the air pilots in a good fellowship organization. The club will have no dues or membership fees. Persons who have been passengers and aero editors can belong as "honorary" members. This is the first the Eastern aero world has heard of "Charlie" Willard for many moons.

Judge C. O. Prowse, of Hopkinsville, Ky., has built a fine-looking aerial yacht, with many refinements. All diagonal bracing wires are removed. One row of struts is used instead of two and there is but one main lateral beam. He is working on an automatic stability device on which patents are pending.



7 RUE LALO

3 Oct. 1913

Si la magnéto Bosch n'existait pas, il est certain que l'aviation serait de plusieurs années en arrière

Garros

The halftone is of a letter from Garros endorsing the Bosch Magneto used in his Trans-Mediterranean Flight

Imports and Exports.

The imports and exports of aeroplanes and parts are running far behind the figures for 1912, as shown by the following schedule:

	Sept.		9 mos. ending Sept.	
	1912	1913	1912	1913
Imports, aeroplanes	5 @ $17,162	— ——	8 @ $58,639	1 @ $900
Imports, parts	— $196	— @ $13,548	— $1,439	— $18,617
Exports of domestic aeroplanes	3 @ $5,500	4 @ $13,800	25 @ $84,901	16 @ $48,900
Exports of domestic parts	— $533	— $1,100	— $3,927	— $14,200
Exports of foreign aeroplanes	5 @ $29,259	— ——	14 @ $55,335	2 @ $10,332
Exports of foreign parts	— ——	— ——	— $2,677	
Foreign aeroplanes in warehouse	4 @ $17,055	3 @ $7,623		
Foreign parts in warehouse	— $73	— $85		

Deaths of Army Officers.

San Diego, Nov. 24.—Lieutenants Hugh M. Kelly and Eric L. Ellington met death in flight.

Captain A. C. Cowan, commanding the post, was among the eye-witnesses of the accident.

"They were trying out a new six-cylinder machine," he said, "and they were between 80 and 100 feet from the ground when they lost control.

"The machine was a new one and Kelly was not familiar with it. Ellington went as instructor. The machine had a dual control, which enables either occupant to manage it at will. The controls were connected, enabling the instructor to correct instantly any mistake made by the pupil.

"The machine apparently began its descent in a proper manner and at the usual angle. Then it appeared out of control. The altitude was so low we felt the officers would have only a rough fall.

"A careful inspection of the wrecked aeroplane convinced us that the controls were in good order. The men were instantly killed."

"The death of Lieutenants Kelly and Ellington was due to their starting the engine when 80 feet from the earth, while making a long glide," said Lincoln Beachy, "and it was impossible to right it in the short distance between the men and earth."

The official report has not yet been made.

Manila, Nov. 14.—Second Lieutenant C. Perry Rich, of the Philippine Scouts, U. S. A., was killed to-day in a fall with a hydroaeroplane into Manila Bay. Lieutenant Rich, who was the only member of the Philippine Scouts attached to the aviation corps here, was encircling the Asiatic fleet, which was at anchor in the bay, when the accident occurred. A launch from the torpedo boat Decatur picked up his body. No official report as yet.

Business Troubles.

Yves de Villers, of the Aeroplanes, Motors and Equipment Company, No. 1780 Broadway, was arrested on Nov. 25 by Detective Leigh, of the District Attorney's office, on an indictment charging grand larceny. The amount involved is $5,239.67, and the charge is made by the Curtiss Aeroplane Company, of Hammondsport, N. Y. The action grew out of a deal involving the purchase of an aeroplane engine.—*New York Herald.*

The jury in the $25,000 libel suit of J. V. Martin againt the Times Printing Company, of Seattle (Wash.), on Oct. 29, brought in a verdict for the defendant. Martin charged that a libelous story of his work as an aviator at the 1912 Potlatch was published by the defendants and hurt his business.

Judgment was rendered Oct. 24, New York, in favor of plaintiff in Aeronautics vs. Fred Schneider in the sum of $195.50 for advertising alleged to be due plaintiff, and execution was issued.

Wright-Curtiss Suit.

On Nov. 6-7 the last hearing was had in the United States Circuit Court of Appeals on the appeal of the defendant company from the decision of Judge Hazel. Briefs submitted and arguments heard. The Court is now working over the evidence and is expected to render its opinion by the end of the month. This opinion will be final unless the United States Supreme Court will consent to a review of the case.

Balloon Ascensions.

Holmesburg, Pa., Nov. 4.—C. P. Wynne, pilot; Dr. Jerome Kingsbury and T. H. Bridgeman, passengers, ascended in the "Penn. I" and landed at Medford, N. J., 25 minutes later.

Oct. 10—Capt. G. L. Bumbaugh took up four passengers from Indianapolis and made a short trip.

New Companies.

Flint Automatic Hydro-Airship Co., Incorporated, Manhattan; hydro-airship factory; capital, $100,000. Incorporators: G. W. Martin, C. H. Flint, H. Flint, Brooklyn.

The Lubin Safety Hydroplane and Aeroplane Company, Incorporated, of Manhattan; hydroplanes, aeroplanes, motors for air craft, $100,000; J. H. Freedman, Benjamin J. Lubin and Arthur P. Marr, 108 Fulton street, New York.

Curtiss Goes Abroad.

Glenn H. Curtiss is sailing again for Europe, and expects to be there for several months. His immediate destination is the Paris show, but most of the winter probably will be spent in Italy.

With Mr. Curtiss will be Mohan Singh, a Hindu from the Punjaub. Singh has been in America for the past three years. He became interested in aviation in 1910, joined the Curtiss training camp at San Diego, and flew a Curtiss land machine for a year or more. With the development of the hydroaeroplane he took up water-flying and in due course qualified as a flying boat pilot. He is one of the few licensed pilots operating three types of machines. Singh's present intention is to make his way to India by easy stages. There he hopes to take some part in the development of aviation in his own country. En route he will make a short stop in London. Singh's real ambition is to find among the wealthy Indian visitors of the metropolis some multimillionaire rajah who would like to navigate the Indus at a speed of a mile a minute in a Curtiss flying boat.

FREE
Christmas Dinners
FOR
300,000 POOR PEOPLE
Will be supplied by
The Salvation Army

Throughout the United States

Will you help by sending a donation, no matter how small

TO COMMANDER
MISS BOOTH

Grandma Gets One

118 W. 14th St., New York City

West'n Dept. Comm. Estill, 108 N.Dearborn St. Chicago

BAMBOO

Special grades of Bamboo for Aeronautic Work. Reed, Rattan and Split Bamboo for models. Tonka Rattan for Skids 1¼ diameter and under any length.

J. DELTOUR, Inc. 804-810 Jefferson St., Hoboken, N. J.

Balloons — Built Complete

Goodyear Balloon Fabric is built for *strength* and gas tightness.
Fabric made for every type of balloons. We also build *complete balloons.*
Built to resist deteriorating effects of weather, storms and wear and tear, Goodyear Balloon Fabric offers you the utmost in safety and *economy.*

GOODYEAR
AKRON, OHIO

Balloon Fabric

It was the Balloon "Goodyear"—built complete in our factory—that won the National Championship Balloon Race at Kansas City, on July 4. It went up in the teeth of a gale that actually whipped to pieces some of the competing bags. *It was the Balloon "Goodyear" that won the International Race for the Gordon Bennett Cup—October 12—going half again as far as its nearest rival.*

Write today for full particulars about Goodyear Balloons and Balloon Fabric (also Goodyear Aeroplane Accessories, Fabric, Tires and Springs.)

The Goodyear Tire & Rubber Co.
AKRON, OHIO
Toronto, Canada; London, England; Mexico City, Mexico
Branches and Agencies in 103 Principal Cities

Write Us on Anything You Want in Rubber

THE WRIGHT COMPANY
ARE NOW PREPARED TO DELIVER
The New Wright Aeroboat, Model "G"
EQUIPPED WITH TWIN SCREWS, DRIVEN BY THE NEW WRIGHT SIX CYLINDER 60 H. P. MOTOR, FITTED WITH MUFFLER AND ELECTRIC STARTER

This craft is the development of years of careful experiment and combines in its novel form the best practice in hydro-aeroplane and flying boat work. The dangerous features of the flying boat—lack of safety in flying, shipping of water and foundering in a rough sea, addition of weight, due to water soaking, the presence of the motor unprotected over the heads of the passengers, and the drag and unseaworthiness of the long fuselage hull, have been eliminated.

The structural details of the new machine are worked out to combine simplicity, strength and reliability.

The craft is perfectly adapted to the use of sportsmen as a machine for safe and comfortable travel over water at high speed.

THE WRIGHT COMPANY
Dayton, Ohio

New York Office
11 PINE STREET

Model Club Notes.

With three out of four Sundays unfit for flying, and the majority of the days upon which the meetings were held rainy, things have been rather unfavorable for the Long Island Model Aero Club members. A series of weekly contests have been arranged, and those that have already been held have proven very interesting.

On October 26 a combination distance and duration contest for hand launched models was held in spite of very unfavorable weather, which kept many of the flyers from participating in the event.

The contest was won by L. Bamberger, of the Bay Ridge Club, with C. V. Obst, of the L. I. M. A. C., a close second. Because of the unfavorable weather, the flying was far below the standard.

The results follow:

	Points Distance	Points Duration	Total Points
L. Bamberger	1	1	2
C. V. Obst	2	3	5
Ness	8	2	10
Braun	6	5	11
Gorgas	7	6	13
Freelan	9	5	14
W. Bamberger	5	7	12
R. Olson	3	8	11
G. Webber	4	4	8
W. Koch	0	9	

Time, 3 p. m. to 5 p. m.

Judges—Messrs. Swini and Moriarity.

The best flying of the month was done on November 2, when a very large number of flyers were at the field. A remarkable point of this day's flying was the fact that every model on the field, regardless of size or type, made flights of over 100 seconds. The duration races by Lester Ness and R. Funk were very interesting, both models circling close to one another with very close and exciting finishes.

Freelan's single propellered model made very excellent distance and duration flights and his three-bladed bent wood propeller when tested on C. V. Obst's large single propellered model gave very good results. Three bladed propellers are becoming very popular with members of this club.

In the altitude and distance races C. V. Obst's bird model excelled all others, showing marvelous climbing qualities, at times reaching an altitude of over 500 feet and making distance flights of over 2,000 feet.

A club repair and supply box is one of the new accessories of the club, so that individual flyers need not bring supplies or parts to the field. A very interesting meeting was held on November 14, at which the writer had the pleasure to be present. A number of very interesting discussions arose regarding contests to be held, proposed challenges, altitude of various flyers on the field, etc.

The club is looking forward to a very interesting series of contests to be held this winter, including the Collins Gold Medal contest to be held shortly.

All queries relating to models and model flying may be addressed to the model editor, Harry Schultz, 23 West 106th Street, New York City, N. Y.

Books Received.

AVIATION, by Algernon E. Perriman, 8vo, cloth, 360 pp., with 30 plates and many diagrams, published at $4.00, postage 21 cents extra, by George H. Doran Co., New York. A popular technical work of interest to the general student as well as to the man who is in aviation as a profession. To the amateur builder of aeroplanes in the United States it will be of incalculable benefit.

Chapters include: What an Aeroplane Is—Instructiveness of Paper Models—Constructional Features of the Modern Aeroplane—Equilibrium in the Air—Lateral Balance—Steering—Longitudinal Stability—Principles of Propulsion—Concerning Resistance—The Cambered Wing—Work of Lilienthal, Wrights, Voisin, Farman, Dunne and Weiss—British Military Trials of 1912—Hydroaeroplanes—Accidents—Romance and Early History—Founding of the Science of Flight—Invention of the Glider and Pioneers—History and Appendices containing numerical examples, application of laws, etc.

Patents.

ISSUED OCT. 21st.

1,076,422—Herbert Champion Harrison, Lockport, N. Y. RADIATOR having vertical front and side faces extending at acute angles to the line of travel, said radiator comprising a vertical series of perforated plates extending at an acute angle rearwardly from said front face, and a series of water tubes extending vertically in the passages between said angularly-extending plates.

1,076,514—Victor M. Osborn, La Fayette, Ind. AEROPLANE, including a main frame of approximately frusto-pyramidal form, a car or platform carried by said main frame, a similarly shaped independent frame pivotally connected with the vortex of said main frame for relative longitudinal tilting motion on a horizontal transverse axis, said independent frame extending above the main frame and beneath the car or platform, and wings fixed to the independent frame and mounted to tilt therewith, the said main frame and car forming a gravity controlled body operating by gravity to maintain a normal perpendicular position, and means for tilting said independent frame upon the body and holding it in tilted position.

1,076,644—William Lafayete Quick, New Market, Ala. ORNITHOPTER.

ISSUED OCT. 28th

1,076,803—J. N. Williams, Derby, Conn. HELICOPTER.

1,076,879—B. Flick and Paul Reinig, Berlin-Mariendorf, Germany. AEROPLANE.

1,077,004—Frederick Sifferman, South Bethlehem, Pa. FLYING MACHINE.

U. S. PATENTS GONE TO ISSUE

Copies of any of These Patents may be Secured by Sending Five Cents in Coin to the Commissioner of Patents, Washington, D. C.

ISSUED SEPT. 23, 1913

1,073,648—Paul Witzel, Berlin-Weissensee, Germany. Combination aeroplane and airship.

1,073,655—Josef Bercz, Cologne-Ehrenfield, Germany. Flapping wing machine.

1,073,977—Ralph P. Fox, Fort Hancock, N. J. Balancing system in which auxiliary balancing and supporting surfaces are arranged in front, the rear, and at opposite sides of the machine beyond the main supporting surface; the auxiliary surfaces being of circular form in plan and elliptical in vertical section.

1,074,007—Frederic Mylius, Atlanta, Ga. AEROPLANE, comprising a transverse carrier plane extending downwardly and forwardly having its upper surface concave, and rearwardly converging guide planes secured at their forward ends to the carrier plane, said guide planes having their upper surfaces concave adjacent their forward ends and convex adjacent their rear ends, etc.

1,074,031—Ira Allen, Dansville, N. Y. AIRSHIP with the controlling means mounted upon and within the gas bag.

1,074,063—Harry A. Orme, Wesley Heights, D. C. RUDDER for aeroplanes comprising a vertical steering plane, said front rod being pivotally connected to the rudder post of the vertical plane, said horizontal plane being centrally slotted or divided to receive the vertical plane therebetween, elevating cords connected centrally to the horizontal plane, said cords being arranged within the vertical plane, and passing through the rudder post, and cords connected to the front rod of horizontal plane, upon opposite sides of the said post, for movement.

ISSUED SEPTEMBER 30th

1,074,135—Nathan J. Paddock, Jersey City, N. J. STABILITY DEVICE, employing a pendulum which can be raised or lowered.

*1,074,256—Edson F. Gallaudet, Norwich, Conn. CONTROL SYSTEM, using movable surfaces to tilt an aeroplane around with its longitudinal and transverse axis operator's seat swinging as a pendulum, operative connections; rudders in pairs, upper and lower, forward and aft and means for turning upper ones in one direction and lower in opposite to balance machine about longitudinal axis, similar arrangement for horizontal rudders, etc.

*1,074,257—Edson F. Gallaudet, Norwich, Conn., CONTROL SYSTEM, using movably mounted auxiliary sustaining planes above and below the main wings, means for simultaneously effecting both a lateral displacement and a transverse angular movement, control mechanism, etc., so that when a machine is tilted laterally, the horizontal component of the reactions may be used for controlling the machine.

1,074,281—George Mitchell, Los Angeles, Cal. Combined AEROPLANE and HELICOPTER.

1,074,288—Martin Pearson, Los Angeles, Cal. HELICOPTER. Navigation.

*1,074,499—Wesley N. Ensign, Whitestone, N. Y. SHOCK ABSORBER for aeroplanes, comprising air cylinder and piston with a vertically disposed standard rigidly secured to the frame of the aeroplane at its upper end; a swinging rod pivotally secured to the lower end of the said standard and extending forwardly from said standard, its forward end journaled to the axle of a supporting wheel, and a member having its upper end pivotally secured to said standard near the upper end thereof and having in its lower end an air cylinder, a second member having its lower end journaled to the axle of the wheel and having its upper end slidably engaging the exterior of the air cylinder, and having a suitable plunger disposed within the cylinder.

1,074,525—Michael A. Parisano, New York, N. Y. STABILITY DEVICE in which pendulum is used to operate ailerons, a toothed bar engaging flexible tip of pendulum dampens small movements; main frame of aeroplane being a tube in which propeller is placed; wings at dihedral angle.

ISSUED OCTOBER 7

1,074,659—Leon Spiro, Everett, Wash. AUTOMATIC BALANCE for aeroplanes, in which horizontal propellers are placed at lateral extremities of the wings and put in motion by clutch, shaft and gearing mechanism from motor, actuated by a pendulum.

1,074,830—Ernst Blochmann, Bitterfield, Germany. SUSPENSION of the sliding cars of airships on a running cable, with means to automatically stop the movement.

1,075,302—Rubino Plastino, New York, N. Y. AEROPLANE in which a central plane is movable fore and aft and auxiliary planes at both ends capable of adjustment to various inclinations, etc.

ISSUED OCTOBER 14th.

1,075,447—Edwin D. Stevenson, Wadsworth, Ohio. EQUILIBRATOR, comprising a lifting propeller above center of machine driven by motor, and controlled by a pendulum.

*1,075,533—Orville and Wilbur Wright, Dayton, Ohio. AUTOMATIC STABILITY device comprising a vane actuated by the air currents with means for operating a balancing mechanism, which consists of horizontal rudder, for longitudinal stability; and a pendulum operating movable surfaces at lateral extremities of machine and a vertical rudder.

1,075,540—John W. Boughton, Philadelphia, Pa. AEROPLANE, comprising a central frame, stationary vertical planes mounted thereon, horizontal planes pivotally mounted on said vertical planes, auxiliary frames movable on said vertical planes, said horizontal planes being pivotally connected with the auxiliary frames and transversely extending planes to the rear of said vertical planes.

1,075,791—Johann Pobuta, Elizabeth, N. J. AEROPLANE with cigar shaped body, flat on top, deck house, main parallel sustaining planes with lower mounted on deck house, propellers, etc.

1,075,863—Ingemar Rystedt and Melvin Steele, Dayton, Ohio. FLYING MACHINE, with "safety wings" which can be folded or extended from opposite sides of the body, lifting propellers, driving propellers, etc.

1,075,969—James Edward Fraser, St. John, N. B., Canada. FLYING MACHINE in which the wings furnish ascension and propulsion by being driven in circular orbits, the plane of rotation being coincident with the line of flight.

ISSUED OCTOBER 21st.

1,076,218—Harry W. Macomber and Frederich H. D. Bergmann, St. Louis, Mo. AEROPLANE. Aeroplane comprising a plurality of overlapping sections with air inlet openings between said sections, said sections being arranged in a series in the line of flight of the machine and with their forward edges in the same horizontal plane, each of said sections having its lateral edges drooped more than the next one in front.

Top plane constructed in two laterally divided portions, each portion comprising a plurality of sections inclined rearwardly and downwardly with the forward edge of all but one of the sections disposed above and spaced from the rear edge of adjacent sections, etc.

1,076,339—Wm. F. Wiles, Thomas Macleod, and Frederick Wm. Wiles, Brisbane, Queensland, Australia. AEROPLANE in which the wings are hingedly connected to the central section and may be moved to various dihedral angles during flight, which movement operates ailerons at lateral extremities of top planes.

1,076,377—John George Aulsebrook Kitchen, Scottforth, England. AEROPLANE having a circular main supporting surface with an opening in the center, the rear part of the surface having a sharp depression in the upper surface along the longitudinal center line forming a keel on the under side.

Now Ready

The Airman's Vade-Mecum

"NO. 1," METEOROLOGY

By Colonel H. E. Rawson, C. B.

(Vice-President Royal Meteorological Society; Council Aeronautical Society)

CONTENTS: Introduction and 5 Chapters on Temperature, Pressure, Wind, and Precipitation. Weather Forecasting. Index.

(*Illustrated*)

Price 40 Cents Net Post Free

"AERONAUTICS," 3, London Wall Buildings, London Wall, London, E. C.

AERONAUTICAL RADIATORS

Built in capacities and types for standard and special aviation motors

Write for prices on standard makes. Send your specifications for special designs

EL ARCO RADIATOR COMPANY

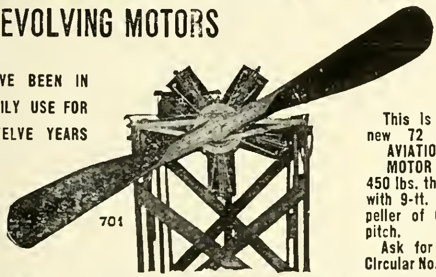
64th St. & West End Ave., New York City

Also Manufacturers of Automobile Radiators of all types

ADAMS-FARWELL

REVOLVING MOTORS

HAVE BEEN IN DAILY USE FOR TWELVE YEARS



This is our new 72 H.P. AVIATION MOTOR 450 lbs. thrust with 9-ft. propeller of 6-ft. pitch.

Ask for our Circular No.16A

THE ADAMS COMPANY

21 ATHOL STREET, DUBUQUE, IOWA, U. S. A.

FOR FLYING BOATS USE

JEFFERY'S MARINE GLUE

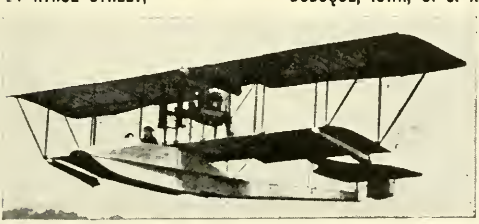
Send for samples, circulars, directions for use, etc.

Use our Waterproof Liquid Glue, or No. 7 Black, White, or Yellow Soft Quality Glue for waterproofing the canvas covering of flying boats. It not only waterproofs and preserves the canvas but attaches it to the wood, and with a coat of paint once a year will last as long as the boat.

For use in combination with calico or canvas between veneer in diagonal planking, and for waterproofing muslin for wing surfaces.

L. W. FERDINAND & CO.

201 South Street Boston, Mass., U. S. A.



The ... **Thomas School**

OF AVIATION

OFFERS SUPERIOR ADVANTAGES

Address, Thomas Bros. Aeroplane Co.

BATH, N. Y.

WIRE

We make an extra high grade plated finish wire for aviators' use.

FOR FURTHER INFORMATION ADDRESS

John A. Roebling's Sons Co.

TRENTON, N. J.

STYLES & CASH

ESTABLISHED 1865

Printers, Stationers Lithographers

Aeroplane, Motor and Accessory Catalogues

Circulars, Brochures, Bulletins, etc. :: ::

135 W. 14th STREET - - NEW YORK

BOOKS

ALL AERO BOOKS FOR SALE BY AERONAUTICS

122 E. 25 St., New York

CHARAVAY PROPELLERS

USED by Gilpatric and Wood in "Times" Aerial Derby

USED by Wood in his flight to Washington

Have proven their superiority

SLOANE AEROPLANE CO.

1733 Broadway, :: New York City

AERONAUTICS

XIII. No. 6 DECEMBER, 1913 25 Cents


On the Way to Two Million
THE demand for Bosch Magnetos is such that within a remarkably few years it has been necessary to greatly increase manufacturing schedules. The Bosch Factories are well on the way to supplying the two millionth magneto.
THE
Bosch Magneto
remains the one perfectly reliable ignition source and as such it is universally recognized. ¶ It is so well made, so carefully designed that its regularity can be depended upon under all conditions. You always will have confidence when your engine is Bosch-Equipt. ¶ If you will tell us the engine you use we shall recommend the magneto most suitable for it and send you literature describing the magneto in detail.
Why not be among the Two Million Satisfied
BoschMagnetoCompany
201 West 46th Street : New York

THE DREAMED AEROPLANE

By RITA GREEN BREEZE

Since the time of the first aeroplane, man has thought of taking power from the air, delivering power by wireless or using some yet undiscovered force to antagonize gravity. Buel Hurndon Green, M. E., was a charter member of the Aero Club of California, a man of distinction who was a credit to his time. He died August 27, 1911, and his life and works were written down in the October issue of AERONAUTICS for that year. His sister, the wife of an attorney of Los Angeles, is a musician with no mediumistic leanings, and with no knowledge of mechanics. The following "message" came to her in a dream on December 2, 1913, and as near as she has been able without technical knowledge she has set down his words as recalled by her.

On the night of December 2, my brother, Buel H. Green, deceased August 27, 1911, appeared to me in a dream; he was jubilant: said he had returned to earth to teach a great thing.

With that he brought forward a contrivance that resembled in form a huge sled, but built without a solid bottom to it, which he said was an aeroplane. There were no wings or overhanging parts, except for a network of copper wires. The frame was made of aluminum and was riveted together with myriads of copper bolts, the caps of which glistened brightly in the sunshine. Toward the front on the right-hand side, as I stood looking at it from the front, was the dynamo, and toward the back on the left was the seat. This seat was made of, and thus completely insulated by, rubber.

He stepped in and soared into the air gracefully, easily, and without the least hesitation; upon alighting he explained to me the principle upon which the invention was constructed.

"On the sea," he said, "the ships are quite at the mercy of the elements. There has been no way found yet to extract the power from the water, both to propel the craft and to insure its safety. The present forms of aircraft are equally, or, on account of the unexplored nature of the atmosphere, etc., still more unsafe.

"This invention that you see is run by electricity, and constructed of aluminum to make it light; the dynamos and all the rivets and wires are made of copper, which is the best known conductor of electricity; my dynamos are sufficiently charged in the beginning to start with, and the wires and rivets are so proportioned and arranged as to act as conductors which supply the power, collected from the atmosphere, to run with: here at my feet (pointing to a place in front of the rubber seat) is a dial which registers the amount of electricity which I have at command at any given moment; if the supply becomes more than I need, I simply shut it off by turning this lever (pointing again to one of a collection of handles in front of the seat), which insulates some of my copper collectors; or, if need be, by deadening the dynamo. This dynamo is placed toward the front, as you see, in order that the air in motion may strike it first, thus enabling me to get the full benefit of a brisk current of air before its force is spent.

"This machine is safe," he said, "because it is not only self-propelling, by gaining its power from the atmosphere, and can be accurately regulated, but because the operator need fear no current of air, however swift or stagnant, however charged with electricity or inert, because he is independent of all these heretofore fearsome forces. He can generate power in his dynamo, when he needs it, and repel an overcharge of electricity when he doesn't.

"Bags of gas, upon which the dirigibles depend, are clumsy and unsafe; and wings to an aeroplane are more unsafe, being often unwieldy, beside the unreliability of the engines. This latter form of invention is only suited to the limited intelligence of birds, which the Creator has so admirably equipped for their purpose, but for man, the supreme creature of creation, let him not continue to be subject to the elements; let him conquer them.

"Set this message of mine abroad on the earth by describing this machine; perhaps it will direct the efforts of my brother inventors, so that they may reach the goal sooner."

Lincoln Beachey has in a way proved something more remarkable than his ability to fly upside-down and to loop-the-loop; he has proved that the public is very much interested in aviation and quite willing to pay for the privilege of seeing flying that is out of the ordinary. One might think no more bizarre idea possible than that of giving a public flying exhibition in San Diego, Cal. No town or city in the United States sees as much free flying. The natives of San Diego have only to look over their heads any day in the week to see the military aviators from the U. S. Army aviation camp flying over the city. It is claimed that the average San Diegan will not bother to turn his head to see an aeroplane in flight, yet San Diego put down $4,000 to see Beachey loop the loop. There was no guarantee, nothing but an ordinary announcement that an admission fee would be charged that afternoon, and the "gate" was four thousand big iron men. What will the gate be in the big cities?

GOVERNMENT ENGINE TESTING PLANT

With facilities now for the testing of engines under official conditions, wide-awake engine builders will at once see the advertising value in a Certificate of the Bureau of Standards of the U. S. Government. The English 12- and 24-hour tests have brought the Green engine an international reputation. The Gyro motor of American fame has had its official laboratory test in Germany. Purchasers will demand official data. The data derived from these tests will be of value to designers of aeroplanes.

The purpose of the testing plant of the U. S. Signal Corps and Bureau of Standards is that of determining the performance under load of commercial gasoline motors for aviation or for general purposes. As previously announced in AERONAUTICS, any maker may have tests made upon payment of the actual expense of the test.

Facilities are provided for determining: (a) horsepower actually developed, (b) weight of motor and essential accessories per actual h.p., (c) fuel consumption per h.p.h., (d) maximum power motor will develop and sustain for six or more hours, (e) reliability during the six hours' test, (f) power at various throttle openings.

One room is the motor room and when the doors are closed gases and the din of the exhaust are kept out of the dynamo room. Testing base is a single cast-iron unit extending 51½ feet into the dynamo room and 6½ feet into the motor room, grooved like a planer bed, provided with holding bolts, and is set on a concrete subbase extending downward 2 feet to solid soil. The cast-iron base has north and south center line scribed into it for aligning motor with dynamo shaft.

By a Yale & Towne half-ton trolley and hoist one man can handle a whole motor without help.

Two pairs of cast-iron jacks with connecting angle iron form a part of the equipment of the test base in the motor room. They provide ready means for both leveling and alignment.

Cooling is provided for by means of a No. 8 Sturtevant top horizontal-discharge blower, its inlet being connected with the outer air. The outlet connects to a galvanized-iron chute extending to the center of the test base. A removable section of this chute is provided so that when in position the air may be forced directly against the motor to be tested or may be diverted to cool the radiator of water-cooled motor.

An impact tube is provided for determining velocity of cooling air and a Taylor thermometer is supplied for checking temperature of cooling air at point of outlet and temperature of cooling water in circulating system of water-cooled motor.

A pair of Fairbanks scales are provided for weighing motor.

Attached to the blower is a pressure gauge for reading the air pressure from the impact tube, a throttle for connection to the gasoline motor, and a double pole single-throw switch for short-circuiting the motor. The throttle may be adjusted for various lengths of throttle openings and fitted to any type carburetter.

The gasoline supply is located on the dynamo side. Two 25-gallon tanks are provided, set in a fixed rest. Above each tank is a hook with pendant and a Fairbanks suspension scale is installed for attachment to either tank. The tanks are filled at the outer end in the usual way and their outlet provides a water pocket with drain cock and a shut-off cock; each shut-off cock being connected to one side of a Y branch. The main stem of the Y extends through the partition for connection to the motor.

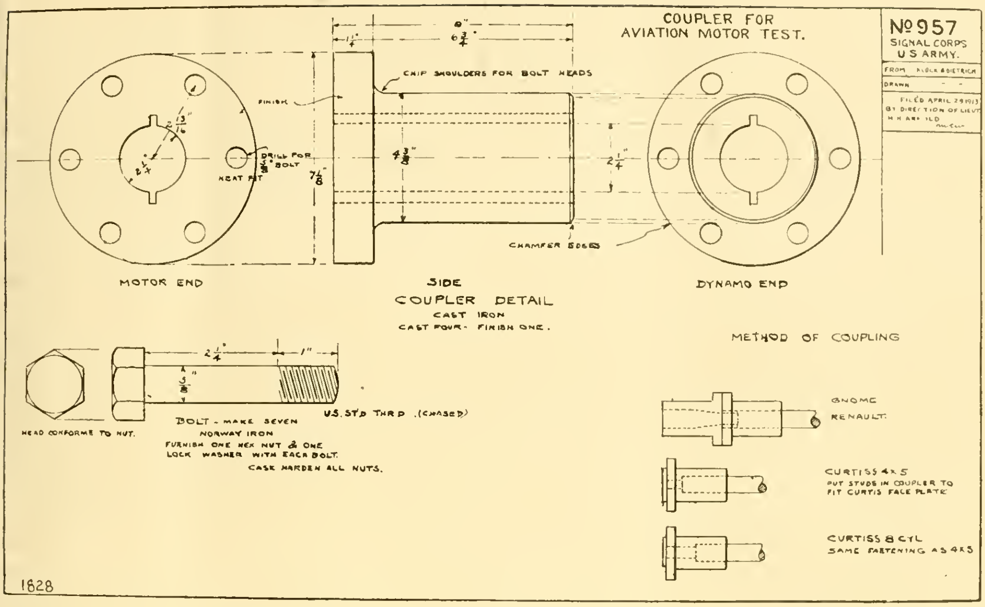
The Sprague dynamometer used is rated at 125 h.p., and should not be loaded above 150 h.p. It carries a Hopkins tachometer. The drive shaft extends through the partition into the engine room.

The switchboard carries in addition to the equipment provided by its makers a subpanel by means of which the blower may be operated either from the local 250-volt circuit or from the dynamo circuit. The dynamometer may be operated as a motor, thus serving the purpose of a motor starter when used in test.

For a test the motor is swung into position, clamped to the angles, using a plumb bob to make sure of center line; surface gauge to determine its height with reference to the motor shaft and spirit level to check its setting. The universal joint is next set on the dynamo shaft and a coupling made up for motor shaft. As these couplings are not universal a set of bronze castings has been provided which may be machined to fit the various types of motor ends. The drawing shows general scheme of attachment of these couplings. A drop-forged end has been provided with the set, which may be utilized for smaller motors having short ends.

All oil is drained from crank case and new oil is brought up to running level, weight of oil used being determined and recorded. Tachometer is tested for accuracy, the gasoline tanks are filled and weighed and gasoline tested for specific gravity, blower operated and velocity of cooling air checked, temperature of outer air is read.

The "dynamometer sheet" shows the observer's records so far as the dynamometer is concerned. Before starting the test proper the leading data describing the motor and the test number is checked with the "motor sheet." Every reading or datum



called for on these sheets must be clearly recorded in order that the test may be complete.

As soon as the motor is started a 15-minute run is made, observing all apparatus closely and stopping and starting as often as necessary to correct any defects which would prevent a life test. Just at the close of the preliminary run the load should be added until the motor loses speed and a record made of the power thus developed. This record should also show power at ¼, ½ and ¾ throttle.

When everything is operating properly, observers take station and arrangements are made for the test proper for a period of six hours at the full rated power of the motor, or if the motor will not develop its rated power, at the maximum load it will maintain. The motor man reads pressure gauge and temperature, the assistant tester reads Fairbanks scale attached to gas tank in use; the dynamo man reads tachometer and notes reading of dynamometer scale, which he locks in position as he signals for reading. This is repeated every 15 minutes during the six-hour test. In interval between tests assistant makes entries for time on all sheets and checks weights of oils, etc., used by motor man. When gasoline tank approaches empty point, dynamo man takes charge of shift of tank connections and, making proper notes, cuts in new tank.

At the completion of the test, the motor is loaded to its capacity and record made, showing actual power developed at ¼, ½, ¾ and full throttle. If motor is water cooled, radiator is watched for refill and weight of water added and when refilled, noted. Short stops if not the fault of the motor need not vitiate the test, but must be noted. Stops of such duration as to give the motor time to get cool vitiate results.

Test being completed, oil is removed from motor and weighed, filled radiator with connections are weighed, motor with its regular fittings are weighed, motor is carefully inspected for loose or defective parts or for bearings running unduly hot.

All engines tested at this plant will receive a certificate from the Bureau of Standards, giving the power for varying speeds, and gasoline and oil consumption, upon payment of a nominal fee. In every case those submitting the engine for test will have to pay all expenses incident to shipment to and from testing plant and for the provision of the necessary gasoline, oil and other supplies. Under direction of the official in charge of the tests, he will attend to the installation of the engine for test, its operation during the test, and its dismounting and removal as soon as test is completed. The owner of the engine under test is privileged if he so desires to be represented at the test.

Complete folder, data sheets, etc., may be had free upon application to the Bureau of Standards.

The 80 h. p. Gnome "Avro" biplane is the latest success of the Roe company. One of the most amusing sights at Hendon at the present moment is to see the pilot, Mr. Raynham, one minute going at over 80 miles per hour and then gently sauntering round the Aerodrome at less than 30.

One of his favorite tricks is to vol-plane upwards. This he does by stopping his engine when 5 ft. from the ground, and then gliding up to some 60 ft. or so.

AVIATION IN THE NAVY

Abridged from the Annual Report

By Captain W. IRVING CHAMBERS

Among the lines of work in naval aviation have been the development of the flying boat and the establishment of a national aeronautical laboratory.* The success of the former is assured, and only the action of Congress in appropriating suitable funds is needed to enlarge the work of the Langley Aerodynamic Laboratory, now being carried on with limited endowed funds. Various Government departments and civil institutions will work with the laboratory and are represented on its advisory committee. A broad scheme of co-operation is now in practice whereby the work at all institutions in the country and the Government departments will be co-ordinated with that of the Laboratory.

The coming year the Naval aeronautic service will be greatly enlarged and will include the use of dirigibles, if the Navy Department acts in accordance with recommendations recently made.

During the twelve months (August, 1912-July, 1913) 1,525 flights were made, as compared with 593 from the beginning of naval aviation, in 1911, up to August, 1912. The total of flights from beginning to end of July, 1913, was 2.118, carrying 1,470 passengers, for purposes of instruction or observation, for 502 hours, covering a distance of about 27,097 miles. These flights have been made by fourteen aviators, in a total of 653 hours, sometimes as pilot and sometimes as passengers.

Other officers to the number of 240 have taken flights of instruction or observation, in addition to other duties. Besides these, 266 flights have been given petty officers and enlisted men, and 130 to civilians. The figures for these latter are included in previous figures.

The Navy now owns five Curtiss and two Burgess flying boats, in addition to three machines of another class. Three officers are under instruction at the present time, all that the department can spare; others expected later.

EXPERIMENTAL WORK.

Lieut. Ellyson has demonstrated the practicability of starting in flight from a taut wire cable (see AERONAUTICS, Oct., 1911), using a Curtiss hydroaeroplane, and in being launched from a catapult (see AERONAUTICS, Dec., 1911). Night flights have been made by Lieut. Towers in a Curtiss hydroaeroplane, in one of which he made the present world's endurance record for water 'planes of 6:35:10.0 and the American endurance record for any 'plane. Another machine of similar make was used by Lieut. P. N. L. Bellinger in a climbing test to 6,200 feet. A Wright land machine has been used for experimenting with various pontoons, finally adopting a single one with balancing floats. Various motors have been used, and is now fitted with a Sturtevant 4-40. Wireless tests have been made with this machine, and notable long flights. Another, made from Wright parts by the Navy officers, was fitted with a six-cylinder Curtiss and a pontoon of same make. Notable moonlight and other flights were made with it, and it had good climbing and manoeuvering powers. Specially strengthened with extra wires, it was saved from collapse in the flight of June 20, when Lieut. Billingsley was thrown out and the machine fell some 1,600 feet, without putting it beyond repair. A Curtiss flying boat has been used for many long flights. The measured speed is 60.53 m.p.h., with Curtiss 90-100 h.p. motor. In all the Curtiss machines, the original power plants have been increased by Curtiss engines of greater power.

Lieut. Ellyson has been launched from a catapult in this machine. The Burgess 70 Renault-engined flying boat has been received too recently for report, but has shown up well (AERONAUTICS, May, 1913). An improved catapult, along the same principles as the old (see AERONAUTICS, Dec., 1912), with improvements, will shortly be tested on board ship.

An improvised Sperry gyroscopic stabilizer is fitted to a Curtiss flying boat, and experiments have not been completed.

Efforts are being made to test out all systems of control, with the purpose of adopting a standard control to be fitted to all Navy aeroplanes, which, after trials, will be installed in all machines.

The model basin has given the Navy a mass of information on the location of steps in pontoons, effects and location of ventilating tubes, efficiency of shapes, etc., and diving effects of hulls now in use. The craftsmanship of the scientific boat builder is now required to decrease weight while improving strength and sea-keeping qualities. Experiments are under way with metal hulls.

Improvements suggested by Navy aviators and by work abroad in the arrangement and shape of wing surfaces are being tested by using power models. It is expected to equip a full-size machine especially for research work in co-operation with the national laboratory. An old 1911 Curtiss hydroaeroplane, converted into a hydro, has now been changed into an experimental machine (E-1). called the "O-W-L" boat (over water and land), and shows a range of speed of 44 to 65 m.p.h. It is efficient as a land machine, with resilient landing gear, enough weight or power of endurance being sacrificed to provide efficiency as a water machine; has

*Aeronautics, Feb., May and Aug., 1913.

improved handiness and efficiency as a water machine, and the possibility of eliminating the land gear for extended flying over water exclusively. Lieut. Smith, who had never flown a land machine before, used this and negotiated eleven landings and starts on land with ease. This was done before the characteristics of the Wright "aeroboat" were known, and it is anticipated that boats of this type will be equipped as an "O-W-L" boat, with wheels, to rival the performances of E-1.

The navy has purchased this year two Burgess flying boats, four Curtiss flying boats, one O. W. L. boat made at the Curtiss factory, three Renault engines, five Curtiss engines, and a great quantity of spare parts.

Three more Curtiss flying boats will be delivered to the U. S. Navy this year, if present expectations are realized. With its highly polished hull of solid mahogany, after cockpit or cabin paneled in the same wood, and upholstered in dark-brown corduroy stuffed with Kapok, these big machines make a beautiful picture. Especially designed to meet the latest naval requirements, the boat has a highly arched forward deck, which effectually shields the occupants of the cockpit from wind and spray and makes swamping of the forward cockpit practically impossible. Instead of the usual flat bottom, this boat has a double concave forming a V in the center, better able to withstand heavy seas; it alights on the water with no perceptible shock. Some changes are noticeable in the superstructure. The wings are both of the same spread, about 35 feet, with a cord of 66 inches. A gap of 72 inches separates the planes. They are covered in heavy unbleached Irish linen, treated with a semi-transparent "dope," which makes the fabric impervious to oil, gasoline or water. High effciency in the plane surfaces was shown on the gliding test.

ARMY AERONAUTICS FOR 1913

By the end of this year the Signal Corps will have 15 aeroplanes and hydroaeroplanes in service. The total complete purchases to date have been 24, of which 9 have been destroyed in accidents.

The following is the list of this equipment, scattered in San Diego, Manila, Hawaii and San Antonio:

1 Wright B, 30 h.p. Wright.
2 Wright C, 50 h.p. Wright.
2 Wright D, 50 h.p. Wright.
1 Curtiss D, 75 Curtiss.
2 Curtiss E, 75 h.p. Curtiss.
2 Curtiss H, 75 and 90 h.p. resp.
1 Burgess F, Wright type, 40 Sturtevant.
4 Burgess H, 70 Renault.

To be yet delivered are: 1 Wright, 90 Daimler; Curtiss tractor, 160 Gnome; and a Burgess tractor, 100 Renault.

More than 2,943 flights have been made, with a total duration of over 626 hours, during the year.

There are 11 officers capable of flying alone. These have military aviator certificates and there are 9 taking instruction. It has been found that a year is not too short a time in which a military aviator may perfect himself. It is to be regretted that the Army offers no inducements to officers to enter flying ranks and even though the limit allowed for this work from the regular army is but 30, this number has never been reached at any one time. The officers, as a rule, remain but a short time in this service unless they have shown marked interest or ability. Of those now flying, but 3 have been connected with aviation for two years and of the balance but 2 for more than a year.

Eleven officers and one enlisted man have been killed in aeroplane accidents since 1908, of which 7 have met their deaths this year.

None of the civilian flyers is trained for military purposes and none of the Militia has had opportunities for flying. One attempt in years past to organize a civilian flying branch failed miserably. Another attempt is now being made along the same lines by another civilian. There are extremely few private aviators even trained in cross country flying. More stringent rules for military aviators' certificates are in force January 1st next.

A new radio equipment for aeroplanes has been developed in the Signal Corps laboratory and it is expected that ranges of at least 30 miles will be possible from the aeroplane (AERONAUTICS, June). The set developed represents the latest achievements in the art: the quenched spark, 500-cycle generator, etc., and it is believed no foreign army is prepared to duplicate the set. Experiments have been made with dropping cards and with smoke signals from the James Means device, the latter with more or less success.

Mapping and photographic experiments have been conducted with good success for the past two years—234 miles being covered in one particular map, every 6 inches equalling 10 minutes of flight (AERONAUTICS, April).

The Scott bomb dropper was tried and this proved the principle of the device correct. No other instrument has equalled it, as proven in the Michelin competitions. Further experiments will be made at San Diego shortly.

Eight Renault 70 h. p. engines have been bought by the Signal Corps and it is expected to have an entire squadron of 4 machines of the Burgess tractor type, with 4 engines in reserve.

All the flying this year has been at Manila. San Diego. Hawaii and at Texas City, with the second division of the regular army. Here long cross country flights were made, up to 4 hours 22 minutes non-stop. One trip, out and back in three days, covered 540 miles (AERONAUTICS, April). At Texas City the flights were made in connection with the field operations of the troops and under the eyes of the commanding officers.

In the Fall of 1912 aeroplanes were used to locate troops, targets, give range and direction and locate hits; in gun fire experiments with the Lewis aeroplane gun (AERONAUTICS, October, 1912).

In firing experiments conducted by the Signal Corps at College Park, the Lewis aeroplane gun was found to be well adapted for service on aeroplanes, as it is sufficiently light in weight for a man to fire from his shoulder. The gun was fired both from the ground and from an aeroplane. In the latter case it was mounted temporarily on a practice machine of the Wright type, and was fired from an altitude varying from 200 to 600 feet. There were 14 hits out of 50 shots. The speed of the aeroplane was 45 miles an hour. The target used was a strip of white cloth 60 feet long by 5 feet wide. The results of this firing were gratifying, as it was found that the aim could be obtained by driving the machine directly over the target and holding the gun in place or by pivoting the gun itself and using both methods together. The rate of firing was 300 to 700 a minute.

The Ordnance Department has developed a high-angle gun for offensive use against aircraft (AERONAUTICS, September).

Aviation is to the Army a vital necessity. Much data has been compiled and everything is now in good shape for rapid progress and practical results if the encouragement asked from Congress is extended. Navigation of the air will be developed into a powerful military force—if not already such—and if present plans can be carried out the Signal Corps will demonstrate the efficiency of military aeronautics. The immediate future seems to rest with the Signal Corps—and Congress. The scientific knowledge necessary is in the Signal Corps, which supervises under the law all the services of communication, observation and reconnaissance and thus far aircraft have proven to be of the utmost value for these purposes. When the aeroplane and the dirigible have demonstrated their value as fighting units, then it may be advisable to relieve the Signal Corps from aeronautical work and put the air machines in a separate arm.

It is hoped, when Congress appropriates the funds, to establish aeronautical centers and schools at Augusta, Ga., San Diego, San Antonio, and other places where land and weather conditions are favorable for teaching. At San Antonio there will soon be a great artificial lake most suitable for water flying and the first and principle center will be located near this city. Here plans include administration and school buildings, barracks for 80 men, field officer's quarters, 20 officers' quarters, 10 sheds, machine shop and stores, shed for 16 auto tractors and a stable. If the estimates for the following year are approved, two non-rigid dirigibles and two revolving houses and hydrogen plants will be put in service. A moderate-sized dirigible of this type will cost about $175,750 and a rotating shed, $122,500. A gas plant will cost $8,955. Portable gas plants cost about $7,500. Three officers and 50 men are suggested for the lighter-than-air work.

THE YEAR 1913 IN REVIEW

Figures for 1913 show that eight manufacturers of aeroplanes have produced and practically sold 162 aeroplanes, of which 71 have been flying boats and 4 hydroaeroplanes, valued at over $857,955. Additional to these, the products of scattered makers and individuals should figure considerably over 100. The majority of these are home-built and fitted with lower-priced engines, so that the valuation of these would approximate $230,000. Of these, a dozen were flying boats and five or six hydroaeroplanes.

It is not at all unlikely that many more than 100 were built of which no record has ever appeared, and which cannot, of course, be counted. Many machines have been rebuilt many times, while we have figured construction entire but once. Parts supplied by manufacturers would add considerably to the total.

The motors built by builders who do not make aeroplanes, or by aeroplane factories which also make motors, total 115, valued at $141,400. Of these figures, but five ($17,000) are included elsewhere.

Aeroplanes and parts of domestic manufacture exported from January, 1913, to November 1, totaled 16, valued at $64,175. Foreign-built aeroplanes and parts imported during the same period totaled one, with a value of $19,625, while two foreign machines were sent out of the country, being valued at $10,332. Remaining in the warehouses are two foreign machines and parts, valued at $7,708. Domestic exports for 1912 were fifty, valued at $167,255, while imports were twenty-nine, valued at $109,733.

The above figures are much better than those of 1912, when one manufacturer esti-

(*Continued on page 215*)

INTERNATIONAL AEROPLANE RECORDS

		1-Man	2-Men	3-Men	4-Men	5-Men	6-Men
Duration, h., m., s.		‡13:17:57.2	6:42:49.6	3:16:00.0	3:11:14.0	3:01:17.0	1:10:17.0
Distance, kiloms.		1,010.9	410.0	‡112.0	‡110.0	250.0	....
Altitude, meters		5,880.0	4,960.0	‡3,580.0	2,830.0	1,400.0	600.0
Greatest Speed in k. p. h.		203.8	‡135.9	‡102.8	‡106.0	‡87.2	....
Climbing Speed	500 m.	†‡*3:35.0	....	....	....	....	....
" "	1000 m.	†‡4:56.5	†‡*9:00.0	....	....	....	....
Speed, h., m., s.	5 kil.	‡*1:43.4	‡2:58.0	‡2:52.0	‡3:48.0	‡3:34.0	....
" "	10 kil.	2:56.6	‡4:24.8	‡5:45.0	‡6:16.6	‡7:08.0	
" "	20 kil.	5:54.2	‡8:51.0	‡11:59.4	‡12:03.0	‡14:00.6	
" "	30 kil.	8:52.2	‡13:18.6	‡17:52.6	‡17:37.0	21:53.8	
" "	40 kil.	11:50.2	‡17:44.8	‡22:44.4	‡23:11.0	29:13.4	
" "	50 kil.	14:48.2	‡23:13.0	‡29:37.4	‡29:47.0	30:31.0	
" "	100 kil.	29:40.0	‡44:36.6	‡59:08.0	‡56:33.0	1:13:01.2	
" "	150 kil.	44:38.0	‡1:07:10.0	....	....	1:49:11.8	
" "	200 kil.	59:45.6	‡2:03:49.0	....	....	2:25:02.2	
" "	250 kil.	2:01:53.6	2:34:48.4	....	....	3:01:17.0	
" "	300 kil.	‡2:49:00.0	3:04:50.0	....	....	....	
" "	350 kil.	‡3:26:16.0	3:34:46.8	....	....	....	
" "	400 kil.	‡3:55:27.6	4:04:42.6	....	....	....	
" "	450 kil.	‡4:24:44.8	....	....	....	....	
" "	500 kil.	‡4:54:06.2	....	....	....	....	
" "	600 kil.	‡5:52:38.0	....	....	....	....	
" "	700 kil.	‡9:31:01.0	....	....	....	....	
" "	800 kil.	‡10:44:45.8	....	....	....	....	
" "	900 kil.	‡11:59:09.6	....	....	....	....	
" "	1000 kil.	‡13:01:12.0	....	....	....	....	
Time, kils., in	¼ hr.	50.0	‡31.0	....	....	20.0	
" "	½ hr.	100.0	‡66.6	....	....	40.0	
" "	1 hr.	200.0	‡133.4	....	‡106.0	82.3	
" "	2 hr.	246.9	191.9	....	....	165.0	
" "	3 hr.	‡310.2	291.9	....	....	247.3	
" "	4 hr.	‡410.9	391.9	....	....	....	
" "	5 hr.	‡510.0	....				
" "	6 hr.	‡490.0	....				
" "	7 hr.	‡522.9	....				
" "	8 hr.	‡585.2	....				
" "	9 hr.	‡661.2	....				
" "	10 hr.	‡744.8	....				
" "	11 hr.	‡820.8	....				
" "	12 hr.	‡904.4	....				
" "	13 hr.	‡980.4	....				
Distance, straight line, in kils.		461.7	....				

7-Men
Duration 1:00:00.0
Altitude 850.0 m.

8-Men
Duration 00:17:25.4

*Made in the United States.
Practically all records are held by Bosch-equipped motors.
‡Made before 1913.
†Not recognized by F. A. I. but official according to A. C. A.

AMERICAN AEROPLANE RECORDS

		1-Man	2-Men	3-Men	4-Men
Duration, h., m., s.		†‡6:10:35.0	4:22:00.00	†1:54:42.60	1:54.00
Distance, kiloms.		†283.62	....	....	
Altitude, meters		†3,548.50	†1,422.00	....	
Greatest Speed in k. p. h.		†174.10	†101.76	†56.26	
Climbing Speed,	500 m.	†*3:35.00	....	....	
" "	1000 m.	....	†*09:00.00	....	
Speed, h., m., s.,	5 kil.	†*1:43.38	....	†6:56.40	
" "	10 kil.	†3:27.87	†6:13.40		
" "	20 kil.	†6:55.95	†12:26.00		
" "	30 kil.	†10:32.51	†18:42.00		
" "	40 kil.	†14:03.59	†24:49.80	1:54.00	
" "	50 kil.	†17:34.88	†31:01.60		
" "	100 kil.	†35:16.65	....		
" "	150 kil.	†53:04.73	....		
" "	200 kil.	†1:10:56.85	....		
" "	250 kil.	†3:32:56.40	....		
Time, kils., in	¼ hr.	†40.00	†24.14		
" "	½ hr.	†80.00	†36.24		
" "	1 hr.	†166.60			
" "	2 hr.	†141.97			
" "	3 hr.	†214.57			
" "	4 hr.	†283.62			
-Man Alighting from mark, meters		†0.445			
-Man, Weight-carrying, pounds		†458.0			

-Man Endurance, Cross-country, Non-stop, 4 h. 31 m.
-Man Endurance and Distance, Cross-country, Non-stop for Monoplanes, 4 h. 31 m., 217.5 miles.
-Man Distance and Duration, Cross-country, Non-stop, 220 miles, 4 h. 22 m.

*World records.
‡Hydroaeroplane.
†Prior to 1913.

Miscellaneous World Records

BALLOONS
Distance—**2,420.653 kiloms.
Duration—**‡73 hrs.
Altitude—‡10,800 meters.

DIRIGIBLES
Distance—810 kiloms.
Duration—15 hrs.
Altitude—‡3,080 meters.
Speed—64.8 k. p. h.

KITES
Altitude—‡7,265 meters.

SOUNDING BALLOONS
Altitude—35,080 meters.

Made in U. S. A.
*Just beaten, according to cables.
Made prior to 1913.

Miscellaneous U. S. Records

BALLOONS
Distance—‡1,887.6 kiloms.
Duration—‡48 h. 26 m.
Lahm Cup—‡1,172.9 miles.

DIRIGIBLES
Speed—‡31.559 k. p. h.
Duration—‡2 h. 1 m. 50 s.

KITES
Altitude—‡*7,265 meters.

SOUNDING BALLOONS
Altitude—‡ 30,486 meters.

*World records.
‡Made prior to 1913.

NEW DEVELOPMENTS IN AERONAUTICS

AEROPLANE INSPECTION OF POWER AND TELEGRAPH CABLES.

That it is feasible and even practical from the results standpoint to inspect power wires, telephone and telegraph lines, etc., from on high, may be deduced from the experiments recently made by Robert G. Fowler in his tractor biplane, with which be crossed the Isthmus of Panama.

The first part of December, Fowler entered into a contract with the Great Western Power Co., of Sacramento, Calif., to carry one of their regular line inspectors over the territory usually covered by several men to discover broken insulators, wires down, etc., in order that the repair crew may get to the spot in the quickest possible time.

Sections of the line that usually take 8 to 10 hours to discover mishaps were covered by Fowler and a passenger-patrolman in less than an hour. A broken insulator was easily discovered from a height of 1,500 feet even. A landing was quickly made and the information telephoned in to the company's office. The progress of the pedestrian-patrolman could easily be seen from the aeroplane. The photograph is that of Fowler in his machine with his passenger.

Fowler's machine is a Gage tractor, Hall-Scott 80-h.p. power plant. Spread of top plane is 42 ft.; lower, 31 ft.; weight ready for flight, 1,100 lbs.; speed, 60-70 m.p.h.

ZEPPELIN MILEAGE STATISTICS.

An interesting statement of the work done by the Zeppelin passenger cruisers since the commencement of the passenger service in June, 1910, has now been published. Ending September, 1913, the list runs as follows:

"Deutschland," 7 trips of 20½ hours' duration, 1,035 kms. (625 miles) distance, carrying with crew 142 persons.

"L. Z. 6," 34 trips, 66 hours 11 minutes' duration, 3,132 kms. (1,880 miles), 726 passengers.

"Ersatz Deutschland," 24 trips, 52 hours, 2,627 kms. (1,580 miles), 436 persons.

"Schwaben," 230 trips, 499½ hours, 28,468 kms. (17,100 miles), 4,622 persons.

"Viktoria Luise," 372 trips, 820 hours 51 minutes, 45,343 kms. (27,250 miles), 7,863 persons.

"Hansa," 268 trips, 577½ hours, 31,273 kms. (18,800 miles), 5,598 persons.

"Sachsen," 170 trips, 337½ hours, 18,614 kms. (11,200 miles), 3,884 persons.

Roughly computed, the above figures work out at 100 entire days spent in the air by the vessels, out of a total of 1,218 days, covering a distance of 130,492 kms. (81,375 miles), or about three times round the globe, and carrying 23,271 passengers without injury to any of them.

I lend all possible aid to AERONAUTICS, as I consider it the most deserving of all aero magazines printed in the English language. J. A. B., Calif.

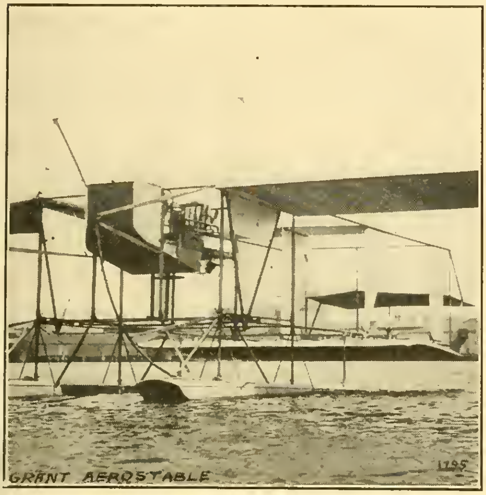
I well know that there are few technical journals that cover their field in such a thorough, reliable and practical manner as AERONAUTICS. H. R. K., Calif.

THE GRANT "AEROSTABLE"

Flights have been made during the past month of Mr. R. R. Grant's water monoplane, with changeable angle of incidence, on the Elizabeth River, Norfolk, Va.

With the exception of the engine all parts of the machine worked out as anticipated, it was found that slight changes would be necessary in the pontoons, that is, they did not free from the water quick enough, therefore, a step in vertical alinement with the center of gravity is necessary.

Satisfactory tests could not be made with the change of angle on account of the unsteady running of the engine and the short periods in the air, but the mechanical parts of this system worked perfectly.



The machine will be converted for land work and in the spring a new engine will be installed. The same landing system which proved so satisfactory on the first machine will be used, French and Italian patents have been issued and on file are German, English and three American patents covering the machine.

If present plans come out as expected Mr. Grant will ship the machine to New York and continue the demonstration work.

It may be interesting to add that the picture shown was taken after the machine had been six weeks on the bay without shelter, during which it went through two very severe storms without damage, during one of the storms it dragged anchor and went into the marsh but without any damage. The machine proved itself to be safer in a storm than the average motor boat.

See AERONAUTICS for August 1912, and August, 1913, for details and drawings.

METAL PROPELLERS NEXT

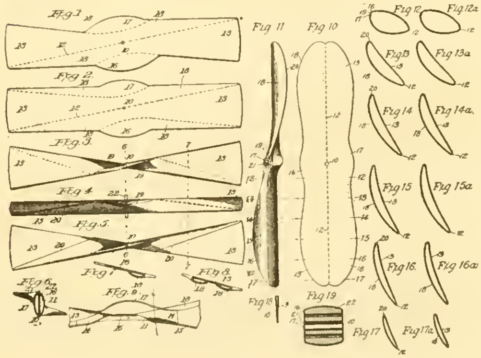
The recent flying boat accident in the Hudson in which a propeller tore loose at the hub and one blade drove through the boat, calls to mind a patent issued some time ago to Spencer Heath.

Inquiry reveals the fact that soon sheet steel propellers will be on the market.

The American Propeller Co. will, of course, continue making the wooden ones in various styles and sizes until they have a complete line of tools and dies for a wide range of manufacture in the metal ones.

"There is no doubt about the metal propeller being the real thing when it is formed up out of a single sheet of steel, as disclosed in my patent," says Mr. Heath. Using steel about .05 to .10 inch in thickness, the weight will be just about the same as the present hardwood propellers. From the manufacturers' standpoint, the great advantage will be cheapness of manufacture. From the aviator's standpoint, it will be their extreme durability against both wear and accident and their almost perfect safety and security owing to the fact that they can never go to pieces or get out of balance in any way. Whatever happens in an accident, the steel will always be there, no matter how badly it may be crumpled. There will be the same safety contrast as between wood and all-steel construction in railway coaches. The steel propellers will also be in demand from a military standpoint. They can be made from the same chrome nickel steel that is required by the War Department for the armoring of vital parts of the machine. The propeller will then be as nearly bullet proof as any other part.

The peripheral velocity of the blades in comparison with the velocity of a rifle ball is such that it will make no practical difference as regards the penetrating power of the ball, whether the blade meets it coming or going in the course of its revolutions.



Figures 1 and 2 are plan views of blanks from which the propeller may be formed. Figs. 3, 4 and 5 are top, side, and bottom views respectively of a propeller formed from the blank of Fig. 1. Fig. 9 is a plan view illustrating the method of forming the material of the propeller into the requisite shape. Fig. 10 is a modified form of Fig. 1. Fig. 11

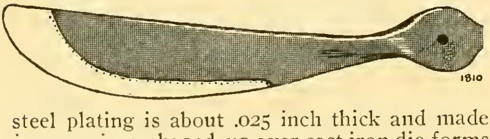
is a perspective view of Fig. 10 folded complete. Figs. 12 to 17 are sections of Figs. 10. Fig. 19 is a section through the hub portion.

The propeller is formed into shape from a blank of sheet material, the central portion of which is formed into a hollow shell at and adjacent the axis of the screw, and the other parts of which form the main portions of the blades, the hollow central portion being extended along the blades toward their extremities in such manner as to give them firm strength and stiffness.

In constructing the propeller, a cast metal form or pattern, made sectional to facilitate subsequent removal, is superposed upon the blank, as shown in Fig. 9. The blank is shaped or spun closely to the pattern which is afterward removed, leaving the sheet metal shell.

The single seam or joint extending from end to end of the propeller (along either the entering or the trailing edge) is made whole by electric or other autogenous welding. The hubs are reinforced by diamond-shaped welded plates carrying the bolt-circle for attachment to the engine forge. The strain of the bolts is taken by a cylinder between the hub plates. The surprising thing about these propellers is their enormous strength and hardness, considering the amount and weight of material used.

Pending the coming out of the all-steel blades, the above mentioned concern now provides steel armor on nearly all the wooden Paragons turned out and is now putting up for the navy large three-bladed propellers similarly protected; also a four-bladed propeller to be used on a seven ton boat. The



steel plating is about .025 inch thick and made in one piece shaped up over cast iron die forms so that it will fit perfectly over the ends of the blades. They are fastened by thin nails 1¼ inches long extending clear through the propeller and further secured by cement which gives great adhesion between the metal and wood. For the U. S. Navy Paragons, copper and bronze are used in place of steel. With this metal protection there is not much left of the question of durability except in case of serious and violent accidents.

AEROPLANES IN THE BALKANS

The Russian aviator, M. Sakoff, played a not unimportant part in the taking of Yanina. He left Nicopolis in a biplane on February 8th, carrying six bombs. At a height of 460 feet he steered for the forts surrounding the town. His machine was assailed by artillery and rifle fire and two bullets struck the biplane; but the parts hit were not vital, and the pilot was able to continue his flight. Over Fort Bezhani, which was the key to the situation, M. Sakoff dropped his six bombs, which did considerable damage and caused a panic. In the course of his return flight to Nicopolis the airman suddenly discovered that his petrol was exhausted, as one of the enemy's bullets had pierced his reservoir. M. Sakoff was, consequently, obliged to descend near Preveza for petrol and repair. He regained Nicopolis without further trouble. The information that he was able to give to the military authorities justified an immediate attack, with the result that Yanina fell a few days later.

Other Bulgarian aeroplanes were hit during the war. Out of four aviators who were killed, but one death was due to enemy's bullets or shrapnel. A great part of the 25 machines were old, more or less decrepit, or obsolete. The aviators were mostly foreign civilians.

The Servians had 20 machines and the Greeks twelve. The Greek aviators did noteworthy reconnaisance work over Salonika and good drawing were made of Prereza. One Greek, with a hydroaeroplane, reconnoitered the Turkish fleet with an observer, dropped bombs on the vessels and forts and returned safely after 2½ hours to the Greek destroyer.

The Turks had about 14 machines but only one was set up when the war broke out. Foreign civil pilots as well as Turkish military were employed. Two machines were captured, a few broken by continued moving, and some burned to save them from the enemy. No mechanics could be had and the lack of information obtainable by aeroplane caused disaster at Kirkkilisseh.

FOKKER FLYING BOAT

EDITORIAL

ARMY AERONAUTICS

Appeals to Congress for aeronautical appropriations during the past three years have resulted in meagre funds indeed. Perhaps those who rail may be spending their efforts in vain. This country is proverbially slow in taking up new inventions. Military aeronautics is undoubtedly new, even to military men themselves. Yet, abroad, every effort is being made by experts in the science of arms to ascertain the last vestige of benefit the aeroplane may be in warfare and through countless experiments and trials to invent improvements in aircraft. The results of all this work are, obviously, most gratifying.

In this new art and science of aeronautics it is particularly difficult to impress matter-of-fact people. The calls of the Army and Navy for aeronautical funds, and the endorsements of civil aeronautical organizations are discounted by Congress. Quite naturally!

National pride on the part of taxpayers, as well as the military importance of being properly prepared, demands that this country be in the forefront of progress in aeronautics as in other branches of national administration.

The whole matter of aeronautical appropriations can quickly be settled by first-hand methods. Let Congress send a small committee abroad to see with its own eyes what the great powers of Europe are doing in aeronautics. Let this committee study the question! All interested in aeronautics are willing and anxious to abide by the views of Congress once the importance of this art is given the opportunity to demonstrate for itself. This is better than volumes of officers' reports and lay handbooks. This would be a Congressional trip that the American people want to have some Congressmen take.

We believe Congress is fair and willing "to be shown" if the proper opportunity is presented. May not this suggestion offer this opportunity?

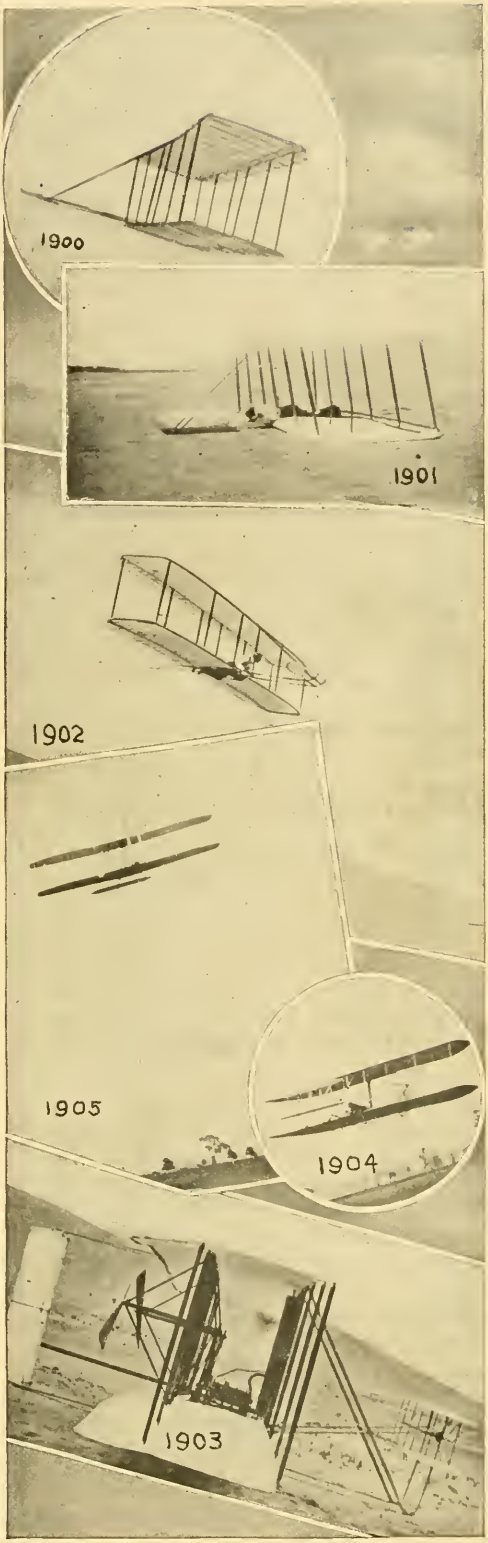
Aeronautics Issues Semi-Monthly

BEGINNING with the first of 1914, AERONAUTICS will be issued twice a month, on the 15th and 30th. The first January Number will appear January 15th; the second January Number will be mailed January 30th. Advertisements will appear every issue or every other issue as desired by advertisers. The price of single issues will be 15 cents.

THINGS are moving more swiftly these days. The "slump" in aeronautics in this country is over. Whatever of industry there is is now solid and growth from now on will be real. "There will be more done in the next 18 months than has been done to date in aeronautics."

THE aeronautical manufacturers are most enthusiastic over the announcement that AERONAUTICS is to be a semi-monthly, the first in this country. "If any magazine gives value received it is AERONAUTICS." "We think the time is about ripe for such a step and no doubt will make AERONAUTICS more popular than ever." "It will increase the field of AERONAUTICS' usefulness to a great extent." With such whole-hearted support from the trade, and with the generous endorsement of the readers, which AERONAUTICS has always enjoyed, the future holds no limitations.

WILL my good friends, the readers, show their so often expressed appreciation of the magazine in an active way? Will you, friends, see that your town library subscribes? If you know of someone who may be interested in the magazine, will you send me his name for a sample copy? Will you induce your clubs' secretaries to subscribe to AERONAUTICS? If there is an educational institution in your town, will you say a word? Wherever you can find an opportunity, will you boost for aeronautics and the magazine?



TENTH A

At a public meeting held December 18, the nearest date of the scheduled monthly meetings of The Aeronautical Society, there was celebrated the Tenth Anniversary of Practical Power Aeroplane Flight. Ten years and a day before, Orville Wright flew a distance of 120 feet under power at a uniform elevation.

The meeting was presided over by William J. Hammer, a long-time friend of the Wright Brothers. Hudson Maxim and Hon. James M. Beck lauded the achievements of the famous inventors. "Much honor is due to the many inventors, from Leonardo da Vinci down to the Wright Brothers, for helping to solve the problem of mechanical flight. A few of them almost did it, but not quite. There was that difference in what they did and what the Wright Brothers did, which, in this world, divides success and failure. Consequently, the Wright Brothers are at once the Columbus, the Peary, the Ericcson, the Morse, the Bell, the Edison, of aeronautics," said Mr. Maxim.

A set of engrossed resolutions were presented to Mr. Orville Wright by Lee S. Burridge in behalf of the Society. Thomas A. Hill was called upon to present Mr. Wright with a bronze figure by Auguste Moreau. Ralph H. Upson addressed the meeting and told of the situation in aeronautics in Europe as viewed by him.

On December 17th was celebrated the Tenth Anniversary of the First Flight made in a Power Driven Aeroplane.

Ten years ago on that day, Wilbur and Orville Wright made four flights on the coast of North Carolina near Roanoke Island, a spot historic in America's history as the site of the first English settlement in the Western Hemisphere.

The first flight started from level ground against a 27-mile wind. After a run of 40 feet on a monorail track, the machine lifted and covered a distance of 120 feet over the ground in 12 seconds. It had a speed through the air of a little over 45 feet per second, and the flight, if made in calm air, would have covered a distance of over 540 feet.

Three days before, on the 14th of December, Wilbur Wright had essayed a flight from the side of the Kill Devil sand hill, but in three and one-half seconds he landed at the foot of the hill without having demonstrated the ability of the machine to sustain itself in horizontal flight. Altogether four flights were made on the 17th. The first and third by Orville Wright, the second and fourth by Wilbur Wright. The last flight was the longest, covering a distance of 852 feet over the ground in 59 seconds. After the fourth flight, a gust of wind struck the machine standing on the ground and rolled it over, injuring it to an extent that made further flights with it impossible for that year.

The gliding experiments of Lilienthal in 1896 led the Wright Brothers to become interested in flight. The next four years were spent in reading and theorizing. In the Fall of 1900 practical experiments were begun with a man carrying glider. These experiments were carried on from the sand hills near Kitty Hawk, North Carolina. The first glider was without a tail, the lateral equilibrium and the right and left steering were obtained by warping of the main surfaces. A flexible forward elevator was used. This machine was

OF FLIGHT

Mr. Wright said: "I wish to take advantage of this opportunity to express to the members of this Society my appreciation of the honor they have done my brother and myself in making us honorary members at the inception of the organization, and also for the resolutions in commemoration of our first flight and the presentation of this figure, which is very beautiful, I can assure you.

"Your presiding officer has mentioned the stabilizer. I think it is a little premature to say anything about it at present. It is true that for some years we have been working on a machine to make flying safe, taking balancing out of the hands of the man, so that only steering is left to the care of the operator. We have a device which experiments of the last few months have given us very great hopes will do this. I do not know what there is I can say about it at present. I do not like to talk too much about things until we have them actually perfected and in operation. What we have at present takes care of both lateral and fore-and-aft balance and it performs in a manner better than an operator can do. In making turns it banks the machine the proper amount, it never allows 'stalling,' which is common to too many of our operators and has been the cause of so many accidents. We have had a few little mechanical problems which have delayed us but we hope to have it ready for the market before the summer season."

---

flown as a kite with and without operator, and several glides were made with it.

A second machine was designed of larger size, and many glides were made with it in 1901. This machine was similar to the one of 1900 but had slightly deeper curved surfaces. Experiments with this machine demonstrated the inaccuracy of all the recognized tables of air pressures, upon which its design had been based.

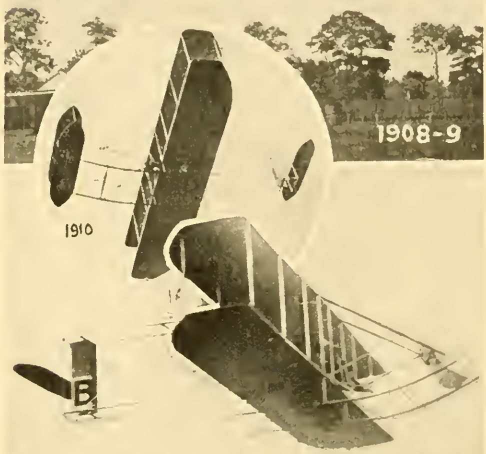
In 1902 a third glider was constructed, based upon tables of air pressures made by the Wright Brothers themselves. The lateral control was maintained by warping surfaces, and a vertical rear rudder operated in conjunction with the surfaces. Nearly a thousand gliding flights were made with this machine. An account of these experiments given in 1903 by Mr. Chanute in talks before scientific societies in Europe and in articles contributed to technical papers, led a number of persons in France to take up experiments with a similar machine, which was called a Chanute-Wright type. Among these were Archdeacon, Esnault-Pelterie and the Voisin Brothers. Captain Ferber had already in 1902 built what he termed a "Chanute-Wright" type machine.

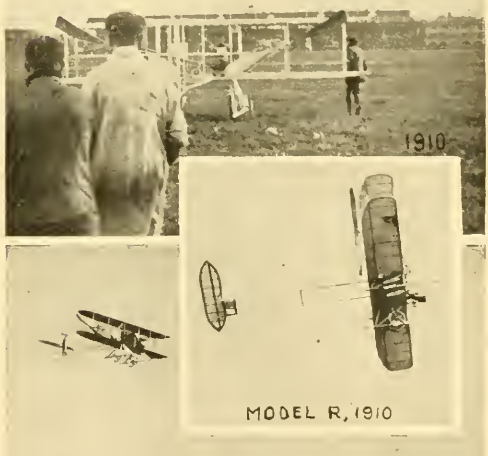
In 1903, the Wright Brothers designed a machine to be driven with a motor. They also designed and built their own motor. This had four horizontal cylinders, 4 in. by 4 in., and developed 12 h. p. Two propellers, turning in opposite directions, were driven by chains from the engine. After many delays the machine was finally ready and was flown on the 17th of December, 1903, as related above.

In the Spring of 1904, power flights were continued near Dayton with a machine similar to the one flown in 1903, but slightly heavier.

The first complete circle was accomplished on the 20th of September, 1904, in a flight

Continued on page 220





"STABILITY IN FLYING MACHINES"*

Criticism on Mr. Merrill's Paper

By L. B. SPERRY

Let me ask if there are any aviators present who care to fly a machine which under certain conditions would suddenly dive or climb, with a tendency more powerful than his controls? If there are any who are looking for such a vehicle on which to test their powers let them choose the so-called inherently stable plane.

Mr. Merrill has conceded that the so-called inherent stability is more or less pendulous in action, resulting in undulating flight. So-called inherent stability cannot call upon a considerable righting couple without moving out of its stable zone to generate that righting couple; it cannot, therefore, return to its zone until the disturbing forces cease. In other words, a so-called inherently stable plane defeats its own purpose when, in order to fight a disturbing influence, it departs from its stable zone to do it. Then consider that a machine having powerful torques, which tend to make it assume certain aspects to the atmosphere, will be most dangerous on rough days. When this machine enters an up or down trend it will try to bring about the same relation to that up or down trend that it formerly had in quiet atmosphere. The aviator will then have to fight to keep the machine from diving or climbing.

Now let us compare an aeroplane with a ship. It is true that the longitudinal stability of a ship working in two fluids, as it does, is not analogous to the longitudinal stability of an aeroplane. In lateral stability it is akin, since lateral tip does not increase the lift of either, but decreases it. We find, as naval architecture has advanced in seeking seaworthiness, that the righting couple has been tremendously reduced. The "Imperator," for instance, has a metercentric height of about the length of your 16-inch slide rule. Now, if powerful righting couples are the vogue for ships, then a raft would be the boat on which to fight rough seas, and we should wish to discard the present type of aeroplane.

We have it from an eye-witness of the so-called lateral inherently stable Fowker machine that to him it did not fly but fluttered constantly, tipping from one side to the other. At times it tipped to large angles, and what amazed him was that it did not go all the way over. From the foregoing we feel justified in describing such a machine as inherently cranky instead of inherently stable.

So-called inherent stability is not a new thing; on the other hand, very old. Langley, Lilienthal, Montgomery, all worked on this theory for stability. One of the first Bleriot machines was a following plane type, copied from Langley. In 1905, John J. Montgomery, of Santa Clara, California, filed a patent for his inherent stable plane. From 1885 to October 31, 1911, he experimented with his inherently stable plane which caused his death when he evidently was unable to straighten it from a nose dive. That that type is not the present type, is only another indication of the fallacy of a large righting couple.

My experience has led me to believe that present machines have more righting couple already than is necessary. So much for so-called inherent stability.

The sum and substance of Mr. Merrill's paper is that present machines have certain defects in design which make them unsafe. He suggests remedies for these defects, and concludes by saying that before aviation is placed upon a firm foundation a correct theory of design must be worked out by laboratory research.

Paragraphs 5 and 6 of the abstract read as follows:

"Present machines are so badly designed that dangerous couples are introduced which have to be offset by other couples introduced by the pilot. That we fly as well as we do is not due to the design of the machine but to the skill of the pilot."

"It is possible to design a machine in which the couples introduced are righting couples, and in which no offsetting couples are needed. Until such a machine is produced there will be only a small market for the sale of flying machines."

All save one minor defect in "present machines" do not exist in a correctly designed machine, as for instance the Curtiss flying boat. I have no connection, by the way, with the Curtiss Company, but am naming this machine because it is the one with which I am familiar.

The first defect, see paragraph 4 of the body of the paper, reads as follows:

"These rotations have a great influence upon safety in flight, not only because they throw the machine away from a safe horizontal position, but particularly because they affect the speed of the machine upon which control depends. Of the two, a stalling rotation is the more dangerous for two reasons: (a) because the pressure angle is increased, which increased the resistance, and, unless the thrust of the screw is increased proportionally, the speed is decreased. This is always dangerous, and many accidents have been due to stalling. (b) If the angular velocity of a stalling rotation is high, there will be a rapid increase of pressure per square foot on the supporting surfaces,

*Read before the Society of Mechanical Engineers, October 14, subsequent to the Merrill's lecture before the same Society.

and this sudden strain may cause the machine to collapse. Several deaths have been due to this cause."

Reason (a). We will grant that the theory is correct, although I do not know of anyone experiencing difficulty along this line.

Reason (b). That if the angular rotation is too high, it may cause the collapsing of the machine is ridiculous. Imagine a machine to be dived vertically so as to attain a maximum velocity of 125 miles per hour (Beachey timed on a vertical dive). The machine to then be given the angle at which it will give the maximum lift, this total lift on a 2,000 flying boat will be 6.7 times the normal lift. This is a rough estimate of the maximum stress that can be possibly exerted upon a machine. Dr. Zahm allowed a safety factor of 10 or 12 on the Curtiss flying boat. Mind you that in normal flying one never reaches beyond 70 or 75 miles per hour. I can of course get the necessary coefficient from Eiffel which would allow me to calculate the stress within a small per cent.

Next, see paragraph 7, which reads:

"Too rapid a diving rotation has caused the downward collapse of machines and the deaths of some aviators." This stress has been considered in a similar manner by Dr. Zahm in the design of the Curtiss Flying Boat.

Referring to paragraph 11 of his paper, Mr. Merrill does not consider the pressure brought to play on the tail surfaces, when the machine's angle is changed from 5 deg. to 8 deg. The stability couple produced by the shifting of the center of pressure is very small compared with the stability one caused by pressure on the tail planes. Eiffel's graphs show that a change of angle of from 5 deg. to 8 deg. shifts the pressure 2½ per cent. forward, which means a moment of ⅛ feet on a machine having a 5 foot cord. The anti couple would therefore be on this 2,000 lb. machine 250 lbs.—ft. Now let us consider the stability couple. The 50 sq. ft. of tail area having an angle of 3 deg., will give us according to Eiffel, 144 lbs. lift, acting at a distance of 14 1-5 ft. The stability couple is equal to 2,045 lbs. ft. minus 250 lbs. ft., the anti couple produced by the center of pressure shift, leaves 1,795 lbs. ft. stability force.

The gist of paragraph 18 and on, etc., is given in paragraph 4 of the abstract, which reads:

"In most machines lateral stability is maintained by increasing the positive pressure angle of the tip to be raised. This tends to retard that tip and turn the machine in the wrong direction. This false turning movement is offset by the vertical rudder. It is possible to maintain lateral stability by moving a surface to a negative angle on the tip to be lowered, and this will produce a turning movement in the right direction, hence no offset will be needed."

This defect is not present in the Curtiss machine, when the high side is retarded more than the low one because of the down trend that exists between the wings.

NEW TESTS FOR MILITARY PILOT

The following requirements for a military aviator, effective January 1, 1914, have been approved by the Secretary of War.

Make a cross-country flight over a triangular course not less than 100 miles in perimeter with two intermediate landings; flight to be completed within 48 hours after start.

Make a straight-away cross-country flight, without landing, of at least 60 miles, over a previously designated course; return flight to be made either same day or first subsequent day weather permits.

During both flights candidate shall remain at least 1,500 feet up.

Remain for at least 30 minutes at an altitude of between 2,500 and 3,000 feet. This requirement may be accomplished during one of the cross-country flights.

Execute a volplane, with motor cutout completely, at an altitude of 1,500 feet, the motor to be cut out when aeroplane is over the landing field, and on landing cause the aeroplane to come to rest within 300 feet of a previously designated point.

Reports will be submitted giving the main military features observed during the flights made under first two paragraphs.

No tests made with passengers.

The candidate will then be examined theoretically and practically on his ability to read maps; his knowledge of the compass and how to steer thereby; his knowledge of the aeroplane, i. e., what constitutes safe construction; how to make the ordinary repairs of an aeroplane; the action of the machine under ordinary flying conditions, covering the points on the action of the controls, how the angles of lift on the wings change in making turns, how the pressures change both on the main planes, rear elevator, and vertical rudder; and what constitutes safe flying as far as gliding, banking, etc., is concerned.

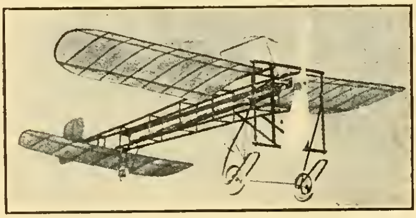
He will be examined on his knowledge of gasoline motors, carburetters, the most common troubles that occur to motors, and how to correct them. He shall be able to make simple repairs, dismantle and assemble motors, and shall show a thorough knowledge of all motors in use at the school.

He shall be examined in meteorology and topography in so far as they relate to aviation.

To AERONAUTICS.—You have done a great pioneer work. W. S. H., Miss.

SPECIAL PREMIUM OFFER TO MODEL BUILDERS

A special premium offer is made to new subscribers in the model field. A complete set of materials for a model Bleriot-type monoplane, shown in the



illustration, with directions for construction and flying, will be given free with each new yearly subscription sent in by a model flyer. This set of parts sells alone for $3. The subscription to AERONAUTICS is $3 yearly. Readers of the model page may have both for the price of one.

This unassembled model is built by the Wading River Mfg. Co., of Wading River, N. Y., and includes complete woodwork and rattan cut to lengths, fabric for covering planes, proofing solution, wheels, ball-bearing propeller shaft, propeller blank, rubber strands, nails, wire, tubing, axle, etc., etc. This concern makes, in unassembled or assembled form, miniature aeroplanes of all the well-known types and furnishes supplies of all kinds for the building of miniature flying machines. An extensive catalogue is sent free on request.

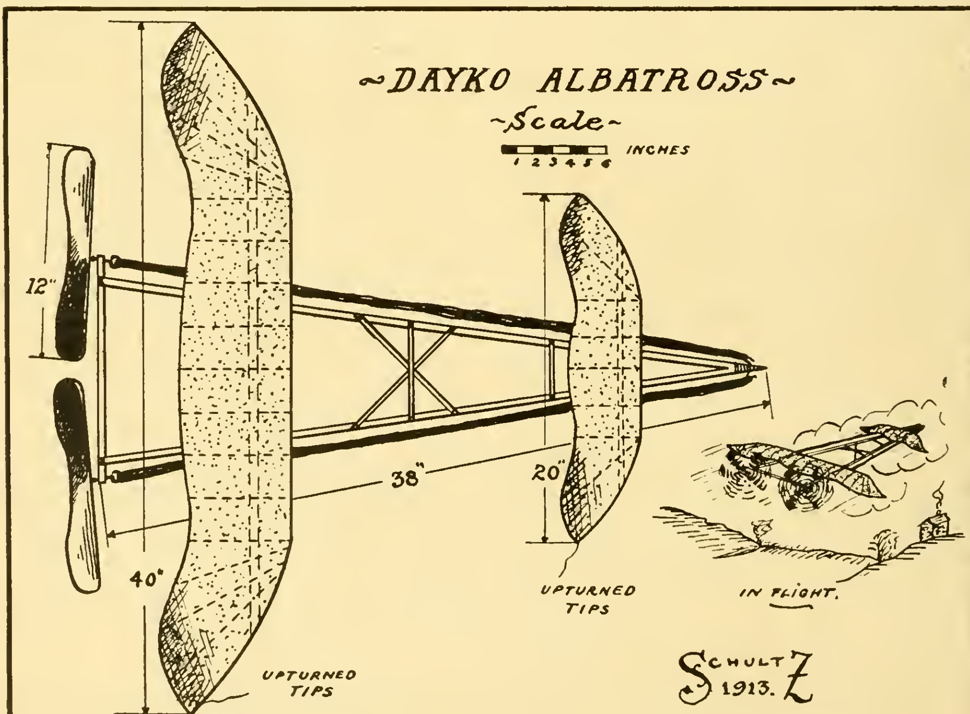
MODEL NOTES

By HARRY G. SCHULTZ, Model Editor.

The model shown in the accompanying drawing was constructed by Derza Dayko, of Perth Amboy, N. J.

In spite of its large plane surface and high pitch slow turning propellers, it is an excellent flyer and has made flights of 2,100 feet and 121 seconds' duration.

The fuselage is of the well-known "triangle" or "A" type, and is constructed of two spruce strips 38 inches long by $\frac{3}{8}$ x $\frac{1}{8}$ inch in cross section, braced at the center by an X-brace of bamboo. The rear brace or propeller bar is also constructed of split bamboo $\frac{1}{4}$ x $\frac{1}{8}$ inch.



The planes are constructed of spruce and bamboo, the main spar in each being of spruce; the spar in the main plane being 1/4 x 5/32 inch in thickness, and that in the elevator being 3/16 x 1/8 inch in thickness. The ribs and entering and trailing edges of the planes are of bamboo, and the tips of each plane are given a slight negative angle, as shown. Both planes have a rather deep camber and are covered on the upper side with bamboo paper, treated with Ambroid varnish.

The propellers are 12 inches in diameter, with a pitch of approximately 36 inches, and are carved from a solid block of white pine. The bearings consists of the usual small pieces of tubing and washers. Each propeller is driven by 11 strands of 1/8-inch flat rubber.

MODEL GLIDERS.

Although there are many model flyers thoughout the country, there are very few who have gone into the model glider side of the sport, although those who have experimented in this manner will readily testify that much more sport can be had with model gliders than with the model aeroplanes.

In order to obtain good glides, a hill or slope must be obtainable, and the glider is launched from the top of the hill against the wind, with the nose of the glider pointing slightly downward.

A glider must be much more delicately balanced than a model aeroplane, and flights can be obtained with a well-balanced glider of over 1,500 feet with durations of over 100 seconds. If the glider has the least too much elevation and is headed into a strong breeze, it will quickly stall and slide backwards. The object is always to get the glider on an even keel, and in view of the fact that the glider is headed into the wind, there always is a tendency for the front of the machine to rise and the rear to drop, thereby causing the glider to stall, as above stated. To overcome this it is generally necessary to weight the front of the glider in some manner, although the writer knows of one flyer who had his front plane, or elevator, so arranged as to increase or decrease its surface, according to the velocity of the wind.

The writer is an enthusiast on this side of the sport and would like to hear from others, receive descriptions of their gliders, results of flights, etc.

All queries regarding models and model flying should be addressed to the Model Editor, Mr. Harry G. Schultz, 23 West 106th street, New York City, N. Y.

MODEL AEROPLANE CIRCLES CITY HALL.

Mr. Frank Schober, late of the Curtiss Company, has lately turned his attention to performing stunts with model aeroplanes, and on the 21st of November, 1913, he proceeded to entertain the downtown section of New York by launching a model from the tower of the World Building. The model was a small affair, of a type known as Red Racer, and immediately following the model a small glider was launched.

The model climbed in spirals to an immense height, circled the City Hall several times and with unerring accuracy landed in the doorway of the Hall, as though it had full intentions of paying a visit to his Honor the Mayor. The glider soared practically out of sight, having a duration of over 2 minutes.

The tests were witnessed by a large crowd and Mr. Schober had a very difficult time getting his model into his possession again.

THE COLLINS CONTEST.

The Collins R. O. G. model contest, held on December 14, proved to be a great success and resulted in a new world's record being established by Mr. R. Funk, of the Long Island Model Aeroplane Club, with a flight of 1,620 feet, breaking Mr. L. Bamberger's record of 1,542 feet.

In the distance contest held in the morning, the small, speedy model of Mr. C. Obst (L. I. M. A. C.) had its own way and looked to be an easy winner, but by his last flight Mr. Funk demonstrated the superiority of his model by easily eclipsing Obst's best flight of 1,264 feet.

The afternoon contest was for duration, and Hodgman (B. R. M. A. C.) showed that his model possessed great stability in spite of the very strong wind blowing, by winning the contest with a flight of 56 2/5 seconds. The field was covered with small trees, which greatly interfered with the flying of the models and resulted in a combination model flying and tree climbing contest. A very strong wind blew all day, and it can be said that there were not more than two or three models in good condition after the contest. While in the air some of the models performed feats that would have put Mr. Pegoud to shame, looping the loop, flying upside down, side slipping and performing other marvelous feats.

Mr. Edward Durant and his very able assistant, Mr. George Bauer, conducted the contests in fine style. Mr. Durant acted as official timer and Mr. Bauer had the tiresome task of measuring all flights, and it can be said that quite a number of miles were traversed by him. The contest was conducted on the point system, and after the mathematicians had consulted, it was found that Mr. R. Funk was the winner. The results are as follows:

POINTS.

	Distance.	Duration.	Points, Total.
Funk	1	3	4
Hodgman	4	1	5
Obst	2	5	7
Heil	6	2	8
Cavanagh	6	4	10
W. Bamberger	3	7	10
Ness	6	5	11

Judges—Messrs. Durant and Bauer.

The prize for which the contest was held was a handsome gold medal offered by Mr. Francis A. Collins. Mr. Collins is one of the benefactors of the sport and is continually offering prizes to encourage the flyers.

MODEL CONTESTS.

Excellent contests are held every Saturday afternoon at Van Cortlandt Park, between the hours of 2, 3 and 5 o'clock. The contests held on December 6, 1913, for duration, R. O. G. models, was won by Mr. Frederick Watkins, with a duration of 62 seconds; second, Mr. Carl Trube, 55 seconds, and Mr. Radcliffe was third with 46 seconds.

Contests in competition for a cup offered by Mr. Herreshoff started on December 14. The first contest was a very exciting affair, with a great number of spectators and competitors, and was won by Mr. Frederick Watkins, who, by the way, seems to have the knack of winning these weekly contests, with a flight of 1,224 feet, rising from the ground. Mr. Radcliffe was second, with a flight of 940 feet. These contests will run for two weeks longer and promise to be very interesting affairs.

SUBSCRIBER'S FORUM

ON LATERAL CONTROL.

May 19, 1912.

To the Editor:—

In regard to Albert Adams Merrill's article in your April issue on the "'The Fallacy' of Existing Systems of Lateral Control":

When Mr. Merrill states that in his proposed system of producing simply a negative angle of incidence on the high side of the aeroplane for lateral balance "the rudder plays no part," he must be calculating on flying in random directions in the air; for in order to keep in the straight or desired course the vertical rudder must surely be used in nearly every balancing operation with such an arrangement. If both ailerons are meant to be normally lifting, then to leave the low-side aileron normal and first simply decrease the angle of incidence on the high side must cause greater speed on that side and consequent deviation from the course unless the rudder is used to counteract it; and if the rudder is not used to counteract it, then the greater speed of the high side resulting from the lessened head resistance will tend to cause increased lift—instead of depression—on this high side, making it necessary to bring the aileron to the same angle of incidence upward from the horizontal (in horizontal flight) as that to which the untouched (low-side) aileron is set downwards, before the head resistances on the two sides are equal; for until this is accomplished either the vertical rudder must be used or the machine will veer out of its course—toward the side of the greater angle of incidence; and as, much oftener than not, the amount of depression of the high side caused by bringing the aileron on that side to the same angle upward as it was downward, would not be exactly the amount of depression required to right the machine, the steering device must therefore be used more or less in all these other cases in order to keep in a straight course; and a wavering course is wasteful because longer.

This action is hence more complicated than the present aileron and rudder use; and while it is doubtless somewhat more efficient, especially in making turns, than the ordinary method, which uses large and wasteful angles of incidence and then uses the vertical rudder to counteract the very unequal lateral resistances (such as bringing one aileron to 12 degrees incidence while the other is level), there is, I am convinced, a much better and more logical method. This is the use of ailerons normally level and non-resisting when the machine is flying on the level, thus turning equally as much upward on one side as downward on the other, so that the head resistances are always equal in level, straightaway flight and the vertical rudder is therefore not required at all in balancing, greatly simplifying it; smaller—and hence more efficient—angles of incidence are used than in any other system in producing the same balancing effect, and in banking for turning there is less resistance on the swift-moving, outer side and more resistance on the slow inner side (aiding in steering) than probably in any other balancing method with ailerons or wing-tips, and less use of the vertical rudder is therefore necessary in turning. And, in this connection, it should be noted that the vertical rudder must slow up the whole machine when used, because located at the center line; so that steering by means of using a variable resistance surface on the inner side of the turn is doubtless more efficient, because it slows up only the side that should be slowed.

Besides making ailerons normally level, or zero-angle, I would make them bend in a curve up or down, as does the Wright elevator, thus giving a more efficient lifting or depressing surface than a flat one would; and I also add vertical, lateral sides, extending several inches above and below, so as to conserve the vacuum above and also prevent the compressed air below from spreading sideways to no purpose, especially toward the rear of the aileron; but perhaps level ailerons with a fixed concavity and these vertical sides would be most practicable and efficient.

Yours very truly,

Elmer G. Still,
Livermore, Cal.

THE BOSCH NEWS.

Attention is called to the Bosch News, published by the Bosch Magneto Co., 223 West 46th Street, New York. The Bosch News is a handsome little house organ and each issue contains valuable information on the care of magnetos, new developments, various types, mounting, wiring, relation to horsepower of motors, etc., etc. Every one who owns a magneto should ask the Bosch company to put him on its mailing list. This little journal is full of worth-while data and should be received regularly. This is not a "press notice" but a plain, simple paragraph for the good of all.

PATENTS ISSUED.

*1,077,111—C. R. and A. D. Wittemann, Ocean Terrace, Staten Island, N. Y. STABILITY system. Claims cover combination, with an aeroplane, of automatic pivoted connected balancing vanes arranged in vertical positions parallel to the direction of travel adjacent wing ends and having their upper rear ends turned diagonally outward and forward, means for adjusting said vanes, connection between them.

By shifting the operating lever to right or left, the upper curved edge of the right hand balancing vane will be moved outwardly and downwardly while the corresponding end of the left hand balancing vane will be moved inwardly. By this movement a greater portion of the outer surface of the right hand balancing plane will be caused to assume a more horizontal position and thereby offer a greater resistance to the air and serve to lift the right hand plane, the left hand balancing plane at the same time being caused to present a smaller area to the air and lessening the resistance of the air thereto will permit of the left hand plane rising and thus cause the machine as a whole to move and become properly balanced.

1,077,114—C. E. Baker, Hamilton, O. PARACHUTE for aviators.

THE YEAR 1913 IN REVIEW.

Continued from page 202

mated some 46 as the total production for established factories. All these figures are far below the total for 1911, when the count was 750 for manufactured aeroplanes by bona fide factories and individuals.

The definite advance of the year 1913 bears out in every particular the statements published in the January, 1913, number. Estimates for 1914 by several conservative manufacturers put the production for next year at more than double that for 1913. It is encouraging to note the confident opinion of the trade concerning the outlook for 1914.

The holding of the international and national balloon races in this country next year, as well as the growing interest in the pleasure of free ballooning, will stimulate this sport, and balloon builders view with satisfaction the anticipated increase in the volume of business, which has been negligible for the past few years.

The small exhibition dirigible may be expected to return to the favor of fair managers, as these will appear now as real novelties. With hydrogen easily available in compressed form, smaller and lighter balloons will be built to take advantage of the superiority of hydrogen over coal gas. Perhaps we will see a demonstration of the "hot-air" dirigible next year, as admissions are now made of its practicability.

STATEMENT OF THE AERONAUTICAL SOCIETY REGARDING "TIMES'" AERIAL DERBY.

In the course of arrangements for the race and the interchange of communications between possible contestants and The Aeronautical Society, upon the affirmation of at least three "licensed" contestants that they had no objection to competing in a so-called "unlicensed" contest, and by reason of the fact that one entrant (who turned out to be the winner) was not the holder of any flight certificate from any organization, it was announced to all competitors and was well known that the race was open to any competent flyer who cared to take part.

The Society is given to understand that a few days subsequent to the race the Aero Club of America held a meeting of its contest committee and declared that as far as its "official" records were concerned Charles S. Niles was the winner, and not William S. Luckey, who made the best time, by reason of the latter not being a "licensed" pilot.

Having been informed that the Aero Club of America had, prior to the race, communicated with the *New York Times*, the donor of the prizes, regarding the matter of "license" for the race, The Aeronautical Society addressed the Aero Club of America asking that body to inform the Society whether or not it had so communicated with the *Times* and, if so, the purpose of the interference. No satisfactory information or replies were vouchsafed.

The magazine *Flying*, the official organ of the Aero Club of America, later reported the event, placing Luckey first, Niles second, etc., in accordance with the report of the Society's judges, stating therein that the race had been sanctioned upon application made a few days before and that W. Irving Twombly, then president of The Aeronautical Society and a member of the Aero Club of America, had been appointed the Club's "responsible steward."

It developed that Mr. Twombly had asked for "sanction" on behalf of the Society, without authority. A resolution was passed by the Board of Directors of The Aeronautical Society to the effect that Mr. Twombly's action, though taken in good faith and with the best of intentions, was unauthorized by the by-laws of the Society or any action on the part of the members; the Society being already on record in favor of Federal control. The by-laws provide that nothing shall be done affecting the policy of the Society without vote of the membership. This resolution further provided:

"That it is the sense of this meeting that the Aeronautical Society desires to maintain its friendly relations with the Aero Club of America and all other bodies of a similar character for promoting the general welfare of the science and sport of aviation but the recognized and established policy of this Society is and always has been to maintain strict impartiality in its relations with all other bodies and organizations engaged in similar undertakings, that it is not and never has been affiliated with any other organization and does not recognize and has not at any time recognized the authority of any other organization in directing, controlling licensing, or otherwise interfering in the discharge of the work for which this Society was organized, and

"Be it further resolved that it is the sense of this meeting that this Society should continue to maintain its attitude of impartiality and individuality in all matters aeronautical, both scientific and of a sporting character, at the same time maintaining as far as possible the most friendly relation with all other bodies or organizations similarly engaged."—Statement authorized by the Board of Directors.

AERO MART.

AERONAUTICS

Published Monthly by Aeronautics Press

122 E. 25th St., New York

Cable: AERONAUTIC, New York

'Phones { 9122 / 4413 } Madison Sq.

A. V. JONES, Pres't — **ERNEST L. JONES, Treas'r-Sec'y**
ERNEST L. JONES, Editor — **M. B. SELLERS, Technical Editor**
HARRY SCHULTZ, Model Editor

SUBSCRIPTION RATES

United States, $3.00 — **Foreign, $3.50**

No. 76 — **DECEMBER, 1913** — **Vol. XIII, No. 6**

Entered as second-class matter September 22, 1908, at the Postoffice, New York, under the Act of March 3, 1879.

¶ AERONAUTICS is issued on the 30th of each Month. All copy must be received by the 20th. Advertising pages close on the 25th.

¶ Make all checks or money orders free of exchange and payable to AERONAUTICS. Do not send currency. No foreign stamps accepted.

News In General

AT THE ARMY AVIATION SCHOOL.

The winter course of instruction at the Army aviation school at San Diego started on the 8th of December by a course of lectures on aero mechanics and aero design by Dr. A. F. Zahm, Secretary of the Advisory Committee of the Aerodynamical Laboratory. On December 30 and 31 Prof. W. F. Durand, of Leland Stanford, will give two lectures on propellers. At the close of Dr. Zahm's lectures, W. J. Humphreys, Ph.D., of the Weather Bureau, will give a course on meteorological physics and the laws of the atmosphere as applied to aeronautics. There will follow a course on theory, design and operation of aviation motors, a course on topography, aerial reconnaissance and photography, and a course in radiotelegraphy. The lectures are given immediately after the close of flying each day, which continues from daylight to 10 p. m. It has been found that it requires from nine months to a year, with a lot of experience in cross country work, before a man can really be said to be an aviator.

LIEUT. RICH'S ACCIDENT AT MANILA.

The following is the substance of an extract from an official letter on this subject: The machine was flying at an altitude of approximately 500 feet and through some unaccountable reason Lieut. Rich fell from or was thrown out of the Wright 50-h.p. hydroaeroplane to the waters of Manila Bay. Instant death resulted, as when the relief party arrived on the scene it was found that he had breathed his last. The cause of the fall will probably never be definitely known, as it seems that he got a good start and was progressing nicely at that altitude—when suddenly the machine was seen to wabble and tilt forward and Lieut. Rich was seen to fall clear of the machine, striking the water with terrific velocity, and the machine fell directly, or as near as could be determined, upon him.

DR. BRASHEAR RIDES IN 'PLANE.

Prof. John A. Brashear has been the first scientist in this country to try the aeroplane. Accompanied by Prof. E. C. Larkin, of the Mt. Lowe Observatory, Dr. Brashear was interested in seeing Mt. Holly, near Los Angeles, as a possible site for an observatory. They visited the aeroplane sheds, and Glenn Martin offered to show Dr. Brashear Mt. Holly as no professor has ever seen it before. The Doctor accepted the offer, and pronounced his trip the realization of a dream.

Dr. John Alfred Brashear is an authority on solar phenomena, the floor of the lunar crater Plato, comets and their physical changes, formation of volcanic craters in the moon, development of astrophysical instruments, optical surfaces plane and curved, the refinement of modern measurments, etc. He is a member or officer of many of the world's greatest scientific bodies.

LONGEST FOREIGN CROSS-COUNTRY TOUR.

Daucourt, a French aviator, and a passenger started from Paris on Oct. 21st, with their destination at Cairo, Egypt. The flight was made via Augsburg, Munich, in Germany; Vienna, Budapest, Arad, in Austria-Hungary; Bucharest, Varna, on the coast of Bulgaria, thence to Constantinople, where they arrived on Nov. 9th. On Nov. 16th the start for the second stage of the flight was made. On Nov. 26th they reached Ihsian, in Asia Minor, within 700 miles of their goal, where the Borel monoplane was slightly damaged in landing. On the following night the machine was set on fire, and the force of the explosion of the gasoline tank completely wrecked the machine, thus ending the flight. The total distance flown by the aviators was about 3,000 miles, in 35 days.

FLIES 13,000 MILES IN 39 DAYS.

Paris, France, Nov. 29.—By flying 9,996 miles (16,096 kil.) in 30 consecutive days, Helen won the Michelin prize for the pilot who covers the greatest distance in any number of consecutive days, flying at least 50 kil. a day. The remarkable record was made over a cross-country circuit. Helen covered more than the direct distance through the air between the north and south poles. Counting the flying on nine days, of which Helen lost the credit through having to stop before reaching the official timekeeper, he had covered 20,787 kil. in 39 consecutive days.

SANTA CLAUS BY AIRSHIP.

Cecil Peoli delighted the children of Montreal by flying in to the announced location from a secret starting place, dressed in Santa Claus costume. This is the first time Santa has made his Xmas trips by 'plane.

Corning, N. Y., Dec. 23.—Santa Claus came to Corning by aeroplane to-day. The Corning Business Men's Association hired Frank Burnside, of Thomas Bros., to fly to Corning dressed as Santa, and distribute gifts to the children of the city from his aeroplane as he flew low over the streets.

NEW SPHERICAL RECORD.

Berlin, Dec. 22.—Herr Kevlen, with two passengers, ascended from Bitterfeld, Prussian Saxony, in the balloon "Duisburg" on December 13. He descended at Perm, in European Russia, near the Siberian frontier, establishing a world's distance and duration record. He was in the air 87 hours and traveled a distance of 1,738.8 miles.

BOMB DROPPING IN GERMANY.

The bomb-dropping competition, organized by the Ministry of War, came to an end on Nov. 17th at Doeberitz. The weather was unfavorable and the aviators lacked experience. The winner was Herr Schauenberg, who, while flying at an altitude of between 2,500 and 3,000 feet, managed in the course of an hour to drop two bombs on a target 262 feet in diameter. The attempts were not brilliant, and the entire competition was a deep disappointment to all concerned.—The Aeroplane.

NEW RECORD FOR ARMY.

San Diego, Cal., Dec. 18.—A new army altitude record was made here to-day by Lieutenant H. B. Post, who ascended 10,600 feet, a gain of more than 2,000 feet over the previous record. The ascent was made in a Curtiss 90-100 h.p. aeroplane No. 23, from North Island. Lieutenant Post made the first 3,000 feet at an average rate of 540 feet a minute.

MARTIN MAKES RECORD ALTITUDE FLIGHT.

Los Angeles, Cal., Nov. 26.—Glenn L. Martin ascended with a passenger to an altitude of 9,800 feet. He used a Martin tractor, Curtiss 90-100 h.p. motor.

Raymond V. Morris is building at the Curtiss works a wonderful fine monoplane flying boat.

No Atlantic Flight Yet, Wright Thinks.—*Headline.* Our files corroborate Mr. Wright.—*N. Y. Sun.* Same here!

INDEX FOR VOLUME XIII.

NOTE.—Volume I started with the first issue, that of July, 1907, Volume II started with the issue of January, 1908. Volume III started with the July, 1908, issue. Volume IV started with the January, 1909, number. Volume V started with the July, 1909, number. Volume VI started with the January, 1910, issue and Volume VII started with the July, 1910, issue. Volume VIII started with January, 1911, number. Volume IX started with the July, 1911, issue, Volume X with January, 1912, Volume XI with July, 1912, Volume XII with January, 1913, and Volume XIII with July, 1913.

Only principal articles are indexed. News notes in general, and smaller mentions are not indexed.

TENTH ANNIVERSARY OF FLIGHT

Continued from page 209

covering a distance of about one mile. Altogether 105 flights were attempted during the year, the longest of which were two of five minutes each, covering a distance of about three miles. All of the flights were started from a monorail.

After September a derrick and a falling weight were used to assist in launching the machine.

Experiments were continued in 1905 near Dayton with a machine similar to the ones of the two previous years. Between the dates of September 26th and October 5th, six flights were made, each covering a distance of more than 10 miles and lasting more than 17 minutes. The longest was a little more than 24 miles in length and 38 minutes in duration.

The years 1906 and 1907 were spent by the Wright Brothers in constructing new machines and in negotiations with various Governments. The Wrights proposed to furnish a machine that would carry a man and fuel supplies, sufficient for a flight of 100 miles; to demonstrate the machine with a flight of one hour's duration, in which the machine must cover a distance of more than 30 miles and rise to a height of more than 100 feet. They further proposed to manœuver over circular and "L" shaped courses. They agreed that they were not to receive one penny if their machine should fail in any one of these particulars, but the heads of the military departments of all the Governments were so skeptical that they were afraid of becoming the "laughing stock of the world" in entering into negotiations even under such conditions.

It was not till 1908 that the Wright Brothers found purchasers for their invention. In that year they made a contract to furnish one machine to the Signal Corps of the United States Army and to sell the rights to their invention in France to a French company. In both cases they agreed to carry a passenger in addition to the operator, fuel sufficient for a flight of 100 miles, and to make a speed of 40 miles an hour.

After making some preliminary practice flights at their old experiment grounds near Kitty Hawk in May, 1908, Wilbur Wright went to France to give demonstrations before the French Syndicate and Orville Wright to Washington to deliver the machine to the United States Signal Corps. The machines used by Wilbur Wright had been standing in bond in the warehouse at Havre since August of the year before. Owing to damage done to the machine in shipment, it was not ready for the official demonstrations until late in the year.

Meanwhile Orville Wright in September, 1908, started demonstrations of the machine contracted for by the United States Government. On the 9th he made two flights, one of 57 minutes, and the other one hour and 2 minutes, world's records. On the 10th and 11th, these records were increased, and on the 12th a ight of 1 hour and 15 minutes was made. On the 17th, the tests were terminated by an accident in which Lieutenant Selfridge met his death and Mr. Wright was severely injured, so that he was not able to complete the tests until the following year.

Four days after the accident, on 21st of September, Wilbur Wright made a flight of 1 hour and 31 minutes at Le Mans, France, which record he improved several times during the following months, and on the 31st of December, won the Michelin Trophy by a flight, in which he remained in the air 2 hours and 24 minutes.

From 1907 to date readers are entirely familiar with progress through the reports in this magazine. A complete chronology of the flights of the Wright Brothers and all others up to 1910 will be found in William J. Hammer's "Chronology of Aviation," which can be had free, upon application to AERONAUTICS.

AERONAUTICS

New and Enlarged Edition, Commencing January, 1914

The Leading British Monthly Journal Devoted to the Technique and Industry of Aeronautics

(FOUNDED 1907)

Yearly Subscription One Dollar Eighty-five Cents : Post Free

(Money Orders Only)

Note:—A specimen copy will be mailed free on receipt of 15 cents.

Head Office:

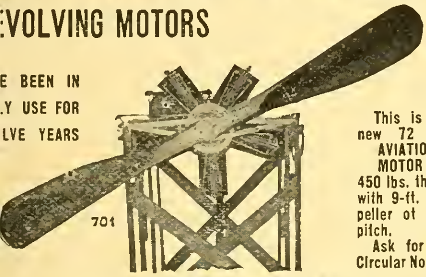
4 London Wall Buildings, London, England

American Office: 122 East 25th Street, New York

DAMS-FARWELL

EVOLVING MOTORS

E BEEN IN
Y USE FOR
LVE YEARS



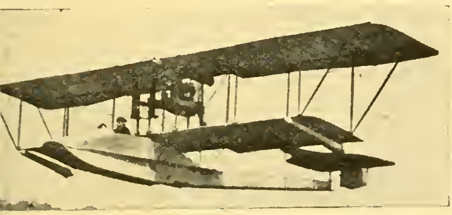
This is our new 72 H.P. AVIATION MOTOR

450 lbs. thrust with 9-ft. propeller of 6-ft. pitch.

Ask for our Circular No.16A

HE ADAMS COMPANY

ATHOL STREET, DUBUQUE, IOWA, U. S. A.



The ... Thomas School

OF AVIATION

OFFERS SUPERIOR ADVANTAGES

Address, Thomas Bros. Aeroplane Co.
BATH, N. Y.

STYLES & CASH

ESTABLISHED 1865

Printers, Stationers
Lithographers

Aeroplane, Motor and Accessory Catalogues
Circulars, Brochures, Bulletins, etc. :: ::

35 W. 14th STREET - - NEW YORK

CHARAVAY

PROPELLERS

AERONAUTICAL RADIATORS

Built in capacities and types for standard and special aviation motors

Write for prices on standard makes. Send your specifications for special designs

EL ARCO RADIATOR COMPANY

64th St. & West End Ave., New York City

Also Manufacturers of Automobile Radiators cf all types

BAMBOO

Special grades of Bamboo for Aeronautic Work. Reed, Rattan and Split Bamboo for models. Tonka Rattan for Skids 1¼ diameter and under any length.

J. DELTOUR, Inc. 804-810 Jefferson St., Hoboken, N. J.

WE ARE HEADQUARTERS

for model aeroplanes, accessories and supplies

Very complete catalog free on request

Wading River Mfg. Co.
Wading River, N. Y.

MODELS

WIRE

We make an extra high grade plated finish wire for aviators' use.

FOR FURTHER INFORMATION ADDRESS

John A. Roebling's Sons Co.
TRENTON, N. J.

BOOKS

ALL AERO BOOKS FOR SALE BY
AERONAUTICS
122 E. 25 St., New York

USED by Gilpatric and Wood in "Times" Aerial Derby
USED by Wood in his flight to Washington
Have proven their superiority

SLOANE AEROPLANE CO.

1733 Broadway, :: New York City

SLOANE

Manufactures the best and most reliable aeroplanes in America

FURNISHES

MONOPLANES—

which are the standard in design and construction.

FLYING-BOATS—

for sportsmen — both monoplane and biplane types. Boats that are entirely satisfying.

GNOME ANZANI RENAULT

at lower prices

Sloane Aeroplane Co.

1733 Broadway - New York City

NAIAD

Aeronautical Cloth

AND

Aero Varnish

We were the first in the field, and the test of time is proving that our product is the best.

Sample Book A-6, Data and Prices on Request

The C. E. Conover Co.

MANUFACTURERS

101 Franklin Street, New York

Sturtevant

(REG. U. S. PAT. OFF.)

AERO MOTORS

IN

NAVY SERVICE

Lieut. Alfred A. Cunningham U. S. M. C., flying over the battleship "Connecticut" in a Burgess Hydro-Aeroplane equipped with STURTEVANT MUFFLED MOTOR.

STURTEVANT Aeronautical Motors are the only muffled aero motors in the world in daily service. They are the only American Motors used by the United States Government other than the Wright and Curtiss.

Catalog No. 2002 describes these motors in detail

B. F. Sturtevant Company

HYDE PARK :: BOSTON, MASS

And all Principal Cities of the World

JANUARY MID-MONTH EDITION

AERONAUTICS

IV. No. 1 JANUARY 15, 1914 15 Cents

TECHNICAL TALKS: The Flying Motorcycle

By M. B. SELLERS

I am asked to say something about the ying motorcycle, meaning, in this case, a iotorcycle fitted with wings, but without ir propeller, and intended to make "hops." 'o do this it is obviously necessary to attain speed during the preliminary run greater ıan that required for flying; and then to se up the momentum, due to this excess ›eed, in overcoming resistance during the lide. The glide can be made by first scending and then gliding down; or, by a early horizontal flight, using an increasing ngle of attack as the speed diminishes. In ıy experience these two methods give ›out the same trajectory.

During the run the wings will be held at small angle, preferably the angle of least orizontal resistance; and the type of wing esired would be one having a very small orizontal resistance at this angle, and a ›nsiderable lift combined with good effiency at its flying angle. (I shall not consider wing dimensions or profile in this article.) In order to rise it will be necessary either to change the angle of the wings with the machine, or to operate the elevator. As the weight of the rider and engine are between the wheels, it will require considerable force in an elevator to raise the front wheel unless some special provision is made for this.

The wheel can, however, be fitted with extensible fork or spring fork or other device to aid in raising front of machine (I have used a spring balanced rear wheel on my aeroplane for a similar purpose for several years).

One serious difficulty suggests itself, viz.: that of landing. If the machine lands sideways or in an inclined position, there will be likelihood of a smash. I shall not at this time consider the question of dimensions, weight, etc., because I have no data at hand.

THE WRIGHT AUTOMATIC STABILIZER

Orville Wright, who has for some months ›en doing active experimenting and testg with the automatic device, which has ›en patented in various countries (see ctober AERONAUTICS for full abstract the system), has been awarded the Col›r trophy for 1913 in consideration of the greatest achievement in aviation" for the ›ar, the practical demonstration of automatic stability, despite the fact that the use the device in 1908-9, when others were arcely flying, was a much greater achieveent than that of to-day's date. On De›mber 31, 1913, Mr. Wright flew before a ›ecial awards committee. He used only e rudder lever, and at one time made ven successive turns of the same diameter -about one thousand feet. In this man›uvre, although a puffy wind was blowing, e machine preserved practically the same ınk throughout, and proof that this bank as the correct one was shown by the conant altitude of about seventy-five feet, hich was preserved throughout the seven ccessive turns, the machine neither skidng nor side slipping.

The apparatus has been greatly simpli›d over the form described so fully in the ctober number, and any oscillating tenden›s are overcome. The purpose of the esent experiments are to determine the st form of the apparatus, and since many ›nstruction changes are continually being ade, a detailed description of the device this moment would have no value.

The Wright device consists essentially of o elements, of course—the one preserves e lateral stability of the machine, the other eserves the longitudinal, that is, its diving or rearing. The lateral stability mechanism is functioned by a pendulum. The pendulum preserves its position, and when the machine, due to lateral oscillations, changes its positions with respect to the pendulum, the latter at once operates a mechanism which brings the machine back to a level. The pendulum motion being entirely lateral no accelerations of the machine can start it swinging. The longitudinal stabilizer is functioned by an air vane on the basis that the only correct base line for operation in longitudinal stability is the relation of the aeroplane to the air that is passing through it and is entirely independent of gravity, of the earth's axis or of any other attraction which would involve the use of pendulums, gyroscopes, etc. The reason for this is that very often in flying there are apt to be large bodies of air that have considerable up trend and down trend, and unless a machine preserves its angle of incidence for proper balance in these up trends and down trends irrespective of its relation to the horizontal, it is apt to be upset.

The apparatus banks the machine on turns the proper amount, it prevents "overcontrolling," it prevents "stalling," it operates automatically to balance the machine fore and aft and laterally—all that the pilot has to do is to steer and land. The device always operates to the exact extent proper and is a better operator than the man himself. It takes balancing entirely out of the hands of the navigator, though the latter is at all times free to take control himself.

Once a course is set, using the automatic device, and the desired elevation attained,

the pilot can spend his time conversing, taking notes, pictures or eating and drinking. On a long glide, the usual lever is set for the desired angle and the device again takes care of head-on gusts as well as lateral stability. The same statement can be made for climbing—and the device recently invented, called an Incidence Indicator, described in the August issue, tells the pilot the safe angle of incidence at which to set his machine for the climb.

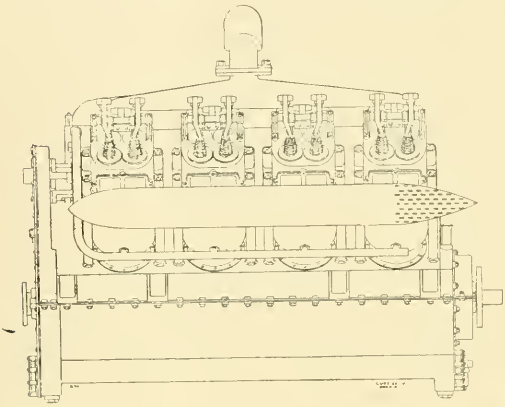
Mr. Wright stated to AERONAUTICS that inside of ten years—this period was mentioned in the query—people would think no more of entering an aeroplane than stepping in an automobile.

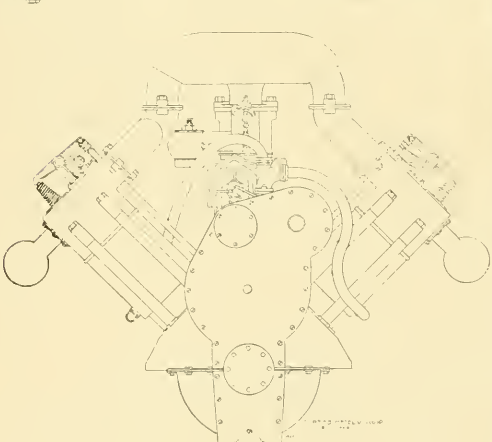
As shown by the September, 1909, number of AERONAUTICS, the automatic stabilizing device is not new with the Wright company. It was even used in actual flights in 1908 and 1909 by Orville and Wilbur Wright.

During the exhibition flights with the device on Dec. 31, 1913, the wind was 15-20 m.p.h., according to the local weather bureau.

CURTISS 200-H.P. MOTOR.

A new model still of Curtiss motors is in course of production at Hammondsport. This will be rated at 200 h.p., cylinders 5 in.

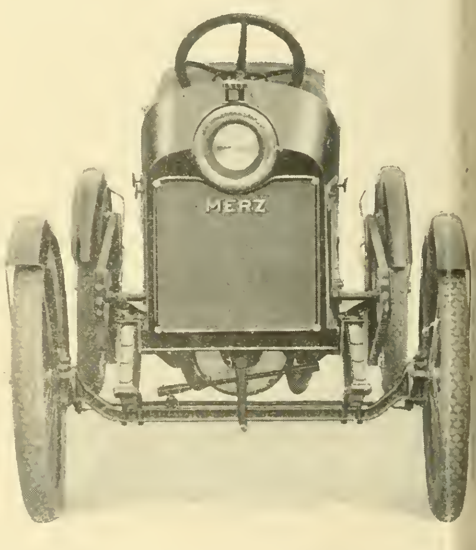




by 7 in. The chart of expected power issued by the company shows 200 h.p. at 1,600, although at 3,000 r.p.m. the power may run up to 260 h.p. The cylinders are larger bore and stroke than those of any other aeronautical engine. The maximum power is high on account of the high volumetric efficiency effected by two inlet and two exhaust valves, all 2¼ in. diameter with 15/32 in. lift. This new motor is known as Model V.

THE CAR FOR THE AVIATION FIELD.

A little car to travel between railroad stations and the aviation field, to run to town with, to cart around parts and repair work, to tow disabled 'planes off the field and for general utility purposes, ought to find favor with aviators and others who have much walking to do in connection with the aeronautical trade. Charlie Merz, the



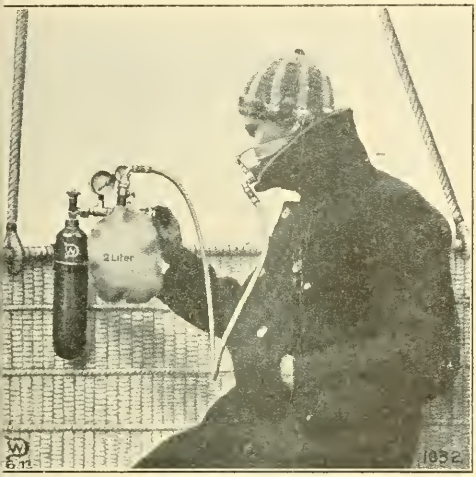
Stutz race driver, is the designer of this very thing, and our old friend, "Talk with Parsons," 54th street and Broadway, New York, sells it, or will to anyone mentioning this magazine. Parsons will even send a circular if you want it. It would be just fine for Sloane to deliver propellers with. Paragon might jack up one wheel and run the band saw with it. "Cap" Baldwin surely needs it to save that long walk from Oakwood Heights. And it only costs $450. Fifty miles an hour and 50 miles to the gallon of gas.

C. C. Witmer is at Miami, Fla., from which point he plans regular trips to Soldiers Key, Cape Florida and later to Palm Beach in his Curtiss flying boat.

OXYGEN RESPIRATION AT HIGH ALTITUDES.

The French seem very prejudiced in favor of oxygen and often start using it at only 10,000 feet. In the Gordon-Bennett Race, Upson and Preston carried a small tube of oxygen for emergency purposes, but did not use it. The breathing apparatus consisted simply of a small gas tight bag connected with the oxygen tank, and provided with a mouth piece through which the oxygen could be breathed.

Based on valuable works on the hygiene of air-navigation by Prof. Dr. von Schroetter, and the eminent aeronauts, Dr. Fleming, Wigand and others, the Draegerwerk has constructed special breathing apparatus for this service.



There are two different types—one for high altitudes in balloons and the other for aero and hydro-aeroplanes. The Draeger, for intended high altitude flying, has an oxygen store of 2,000 litres in large twin steel cylinders. In this apparatus is embodied all the experience gained by long years of successful practice in the construction of oxygen inhalation apparatus. Special care was also here taken in adapting the mask for mouth and nose breathing. The inhalation is started by opening the valve on the oxygen cylinder. A "finimeter" allows of the control of the pressure contained in the steel cylinders, and the oxygen consumed per minute can be ascertained from a small manometer. A regulating screw on the reducing valve permits of an adjustment of the oxygen supply, from 1 to 10 litres per minute. The oxygen passes in the first place into an economizer bag, and is from thence inhaled through a flexible aluminum pipe, which does not hinder the free movement of the user. The additional requirements of outside atmosphere is obtained through a small hole in the mask, so that the breathing air is as a rule saturated with 40 per cent. of oxygen, quite sufficient for alveolaric tension. The exhaled air and oxygen surplus escape to the outside. The working capacity of the apparatus is dependent on the oxygen consumption. If the emergency type provided with 180 litres of oxygen consumes on an average 5 litres per minute, the oxygen store will be sufficient for 36 minutes' breathing. Based on the same average consumption of oxygen, the type to be used for intended high altitude flying supplies one man with air for three to four hours—if twin cylinders are taken up; the same time for two fliers. Special care should be taken that breathing appliances used for aeronautics should be fitted with a reducing valve protected against burning out, as otherwise explosions attended by serious consequences may occur. This apparatus may be obtained from Draeger Oxygen Appliance Co., Pittsburg.

"SKY TRAVEL MADE SAFE."

"An aeroplane that positively won't tip over and which will go faster with a 50 H. P. engine than any other aeroplane with 100 H. P., and which will carry passengers is the invention of John R. Humphrey, of 423 Willard Avenue, Richmond Hill, N. Y.," at least we are so informed by Mr. Humphrey himself in the reading notice he has kindly mailed us.

"Mr. Humphrey has waited until all the improvements and devices he has invented have been amply protected by law before making his discovery known to the world. He has been working on the improvements for sky-traveling for the past three years, and has experimented and tested his machine until he has proven its success beyond the peradventure of a doubt." We have Mr. Humphrey's own words for this.

"With this aeroplane the aeronaut [sic.] can fix his steering apparatus rigidly fast and travel over the machine to the engine when anything is out of order and leisurely make the needed repairs or new arrangements of the parts." Running water and conveniences seem to have been omitted.

"One of the most interesting features of this new flying machine is the automatic balancing device. It is so simple that it's a marvel that it was never discovered and applied before. With this device a tyro can sail aloft in this machine and be certain that no matter how adverse the elements or treacherous the air currents the machine will sail serenely along."

"Another interesting thing about the apparatus is the peculiarity of the shape of the new airship [sic. again]. Mr. Humphrey has applied the name of 'Arrow-aeroplane.' It offers less air resistance than any other sky ship thus far devised and skims through the air practically on the same principle that Nature has embodied in swift birds. It is long and rakish in appearance and answers more readily to the impulse of the machine's power than any aeroplane thus far seen. Technically speaking it is a monoplane." That "long and rakish" is awfully in vogue among reporters.

"Mr. Humphrey has invented many devices, one of his most noted ones being a power-

potato digger, which took the first prize at the State Fair in Minneapolis in 1897, and which is being used widely in the West. One curious thing about the inventor is that he writes verse and has written many volumes. This proves that a man can be a poet and still be practical. His aeroplane promises to be his greatest achievement." If it fulfills the above promises it will dig up more money than ever did a potato digger potatoes.

WHAT IS A RECIPROCATING MOTOR?

November 24, 1913.

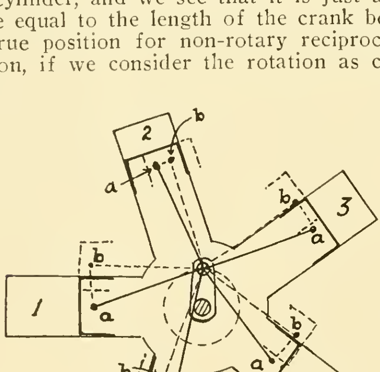
EDITOR AERONAUTICS,
122 East 25th Street, City.

Dear Sir:

At the last meeting of The Aeronautical Society (Thursday, November 20th), Mr. Emile Berliner gave a talk on the revolving cylinder motor, and in the course of his lecture brought out the point very strongly that his motor was not a reciprocating piston motor. This, I wish to state, is a wrong impression and one which can be easily disproved. The reciprocation is there whether the cylinders revolve or not.

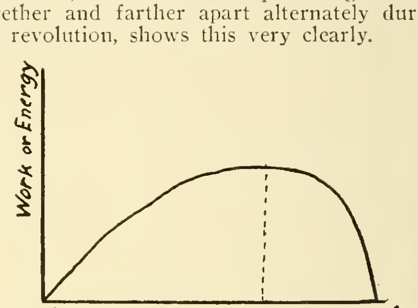
Let us take for example the five cylinder motor as used for demonstration by Mr. Berliner.

Let us consider cylinder No. 1. Here we have the piston in the position 1a. In order to have a true rotary motion it should be in the position 1b, that is, parallel to the axis of the cylinder, and we see that it is just a distance equal to the length of the crank behind its true position for non-rotary reciprocating motion, if we consider the rotation as clockwise.



In cylinder No. 2 the two positions are not so far apart and for a cylinder at a position exactly above in a line with the centers of the crank-pin and the crank-shaft they coincide. As we pass on around the cycle to position of cylinder No. 3 the difference again begins to increase, but is now ahead of its "non-reciprocating" position. For a cylinder in the horizontal position on this side the piston will be just as far in advance of its true position as it was behind on the opposite side. Again at the bottom we find a position of coincidence and from there to the top it again falls behind. Thus we see that in one revolution the piston has reciprocated a distance equal to twice the length of the crank or exactly equal to the stroke of the motor, which is the same as the reciprocation of the ordinary fixed cylinder motor.

The fact that the angles between the connecting rods vary, being less on the side away from the crank, shows that the pistons get closer together and farther apart alternately during the revolution, shows this very clearly.



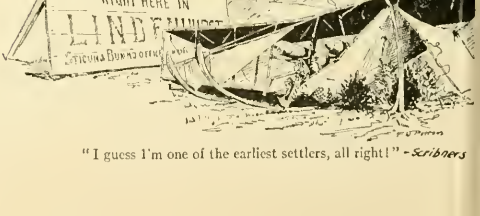
Another erroneous idea is that which one might be led to believe from the statement by Mr. Berliner that there is a loss of power in accelerating the reciprocating parts, and in slowing down and reversing the direction of motion of these parts. If we plot a curve showing the relation between the work or energy of the piston of any reciprocating piston motor and the angular position of the crank we obtain a curve of the type shown in Fig. 2. During the first part of the stroke energy is put into the piston in the form of momentum, the velocity increasing up to the point that the connecting rod is tangent to the crank-circle. From there on, the piston must slow down and in so doing acts as a flywheel, giving up its energy to keep the crank in motion, to compress the fresh charge or to eject the burnt gases as the case may be. The only loss is the friction loss, which is common to all types of engines, reciprocating or otherwise.

Hoping that this letter may be printed in your next issue, while the subject is still fresh in the minds of those who heard the lecture, as I think the matter one of great importance, I remain,

Yours sincerely,

RALPH S. BARNABY.

257 Hamilton Avenue,
New Brighton, Staten Island.

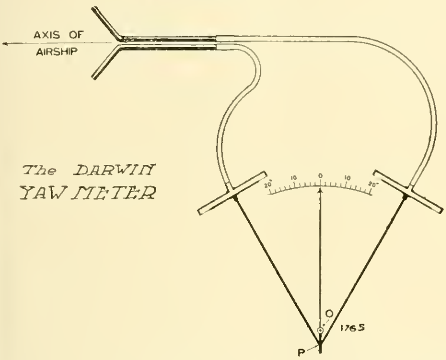


"I guess I'm one of the earliest settlers, all right!" -Scribners

TO MAKE A YAW METER.

Is the little piece of string used by Wright aviators to detect side-slipping, which string caused so much unsatisfied curiosity when Orville Wright was making the first flights at Washington, now to be displaced by an instrument, which does exactly the same thing? The Wright bit of "rag" is not possible on monoplanes but the instrument may be.

A "yaw-meter" is an instrument that measures, if the air is at rest, the angle that the direction of movement of an aeroplane makes with its keel, and at once indicates a "side-slip." If one considers an aeroplane at rest and the air blowing against it, it measures how nearly the direction of the wind is "head-on." "If an eddy in the moving air meets the aeroplane, the direction of the wind will change and this will be indicated. A wind-vane carried by an airship or aeroplane would also show how nearly the movement was head-on in the same way as the yaw-meter. But the wind vane would be difficult to read when



The DARWIN YAW METER

placed in a position free from eddies in the air caused by the aircraft itself. With the yaw-meter the dial and hand can be placed in a convenient place for observation," states Horace Darwin in the first "Wilbur Wright Memorial Lecture" before the British Aeronautical Society, a talk on scientific instruments.

"Two Pitot tubes are made like the letter Y (see figure) with the openings at the tops of the two arms. If the wind blows symmetrically to the two tubes the pressure will be equal in both. But if the direction of the wind changes it will meet the opening at the end of one tube more nearly in the direction in which the tube is pointing, and the pressure will be increased. The opposite will take place in the other Pitot tube and the pressure in it will be diminished.

"The pressure from these two Pitot tubes is taken by two pipes to the indicating apparatus which can be at any convenient distance away. Each tube is connected to a circular box the top of which is an airtight flexible diaphragm which can move outwards. A rod is connected to each diaphragm, and these rods are pushed outwards by the air pressure.

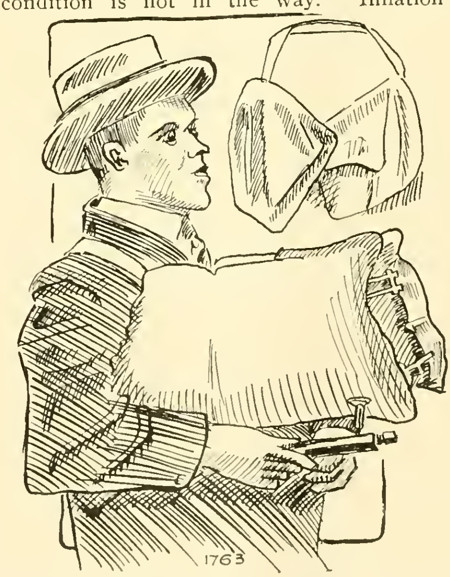
"The hand indicating the angle of "yaw," that is the angle at which the air meets the Y Pitot tube, is pivoted about the point O, and is continued to P. At this point it is connected to the two rods from the diaphragms by a freely moving joint. If one rod pushes with a greater force than the other the hand is moved over to one side, and it will come to rest when OP is in the direction of the resultant of the forces with which the two rods are pushed outwards, and when it is in equilibrium the hand will show on the scale the angle of yaw. If the speed of the aeroplane increases the hand will not move because the air pressure and consequently the pushing forces in the two rods will both be increased in the same ratio.

"The same instrument can be connected to a wind-vane which moves the Y Pitot tubes so as to face the wind. The tubes are arranged to show if the wind has an upward or downward tendency and the angle between the direction of the wind and a horizontal plane is measured."

PERRIN LIFE PRESERVER.

A novel collapsible life preserver has been marketed by a Frenchman named Perrin. A couple of bags hang deflated over one's breast. These may be quickly inflated, on the occasion of a descent or fall into water, by means of a small tube of compressed air, for which a pocket is arranged in one of the floats.

The outfit consists of a well-made and comfortably shaped airbag of rubberized fabric; it slips on and fastens in front, more or less in the fashion of a vest, and in its deflated condition is not in the way. Inflation is



achieved with the help of a tube some four or five inches long, containing air, highly compressed. This cylinder is placed in a receptacle made for it in one corner of the belt, and the pressure of a thumb upon an external lever suffices to puncture the cylinder's cap and allow its contents to expand into the airtight bag. Thus the belt or "brace" may be worn without inconvenience, deflated, and may be inflated immediately when the undesired emergency occurs.

News In General

OFFICIAL REPORT ON ELLINGTON-KELLY ACCIDENT.

The following is the summary of the official report in the case of the accident to Lieuts. Ellington and Kelly. About 7 o'clock on the morning of November 24, Lieut. Ellington, Chief Instructor on the Wright machines, made a flight in aeroplane No. 14, and found that the engine and machine were in excellent condition. On landing, both he and Lieut. Kelly inspected the machine and left the ground. When a mile from the hangars, the machine was seen to descend at a normal gliding angle, beginning at about 200 feet from the ground; the glide continued until about 75 feet from the ground, when the angle of glide suddenly steepened into a headlong plunge, and at the moment of striking the ground the machine was nearly vertical. The machine was practically a new one, having been only a total of 34 minutes in the air before the flight in which the accident occurred.

The students at San Diego made 289 flights, with a total of 43 hours and 34 minutes, during the month of November.

NEW CORPORATIONS.

The Ostend Aerial Navigation Co., Cincinnati, O.; manufacturing and dealing in airships; $15,000. The incorporators are Charles E. Droste, W. H. Droste, Laura Kelcher, Joseph Ostend, Dave Ostend and Agron Strashem.

The Grinnell (Iowa) Aeroplane Co. has come into existence, with the following business men as incorporators: D. S. Morrison, president; F. H. Gifford, vice-president; W. C. Robinson, secretary; E. B. Brande, treasurer; H. W. Spaulding, B. J. Ricker and Jesse L. Fellows.

Connecticut Aeroplane Company, of New Haven, $500,000 paid in. Officers: President and treasurer, Everard Thompson: vice president, E. A. Mullikin; secretary, Samuel C. Morehouse, all of New Haven.

NEW COURSE AT MASSACHUSETTS TECHNOLOGY IN AERODYNAMICS.

Before the Alumni Council of the Massachusetts Institute of Technology at its last meeting, Lieut. Jerome C. Hunsaker, U. S. N., outlined some of the needs of education in aerodynamics, with suggestions as to the courses that are to be offered in the study at the institute. President Maclaurin's recent report to the corporation announced the establishment of the courses, making Tech. the first educational institution in the country to begin the work of making adequate provision for developing the science of aeronautics. Lieut. Hunsaker, who ieceived his M.S. from Tech. in 1912, has been detailed by the Secretary of the Navy for duty at the institute, and having spent the summer abroad, presents now an outline of the plans. Incidental to this exposition were a brief history of the development of aerodynamics and a sketch of what is being done in Europe educationally, experimentally and in aeronautics.

Lieut. Hunsaker dwelt on the fact that the real advances in the making of machines must depend on the man technically trained. It lies with the technical schools therefore to be ready to prepare men for the specialty of aerodynamic work. It is only a question of time when aerial navigation will present its problems to the engineer, and the engineers must be ready.

The speaker was careful to indicate that at the present time the principal demand for engineers of the special kind is from governments. He sees no great present demand for such men in work not fostered by such authorities, and sees no immediate future either for commercial use or for sport. But it is the fact that the governments of Great Britain, France, Germany, Russia, Austria, Italy, Greece, etc., are all actively at work with the flying machine; he believes it to be the results of the solution of tactical problems and that all these powers are not united in making a mistake. For that reason, therefore, the United States must adopt similar methods. It is not impossible that the demand for skilled specialists may be sudden, and it is exceedingly desirable that a body of men be already educated in the special lines that will be needed in the development of air-craft. Mr. Hunsaker believes it would be unfair to students to make of them nothing but engineers of aerodynamics, for it may be some time before such specialists are in demand, but at the same time he realizes that with the engineering training already established at Technology, it is practicable and not difficult to institute courses which will replace certain present options by other ones which bear directly on this specialty.

"Such a course," he said, "would presume good preparation and could be given in one year's time. There should be instruction in advanced mathematics, rigid dynamics, fluid dynamics. experimental aerodynamics, explosion motors, meteorology, propeller, aeroplane and dirigible design, patent law, physics of gases, chemistry of hydrogen and general mathematics of flight." A wind tunnel of the type used in England will be necessary, and is to be installed without waiting for Technology to get to its new home.

An aerodynamic laboratory will be desirable and necessary both for research and industrial testing. The designs made by a student can be tested by himself in the wind tunnel and proved good or bad. Further than this, if a systematic series of models should be designed and tested, some contribution to knowledge must inevitably follow. Motor testing should also be provided for the engines of air craft in a way especially fitted for their peculiarities.

For the present, it is proposed to give courses in general aeronautics and aeroplane design to the officers of the United States navy who are under instruction in the department of Naval Architecture, and to the senior class in mechanical engineering as an option. By next year it is hoped there will be sufficient interest to warrant a complete graduate course in aeronautical engineering. A small special laboratory will be equipped in the near future.

HALL-SCOTT GET 141-H.P. FROM NEW MOTOR.

The Hall-Scott Company reports that the latest test of one of their new 100 h. p. 8 cyl. motors, 134 and 141 b. h. p. were obtained at 1,500 r. p m. The test was run during a period of three days, and at no time, the company states, was less than 131 b. h. p. obtained at 1,500 r. p. m. The factory reports a rush of orders and fine prospects.

NEW HAMILTON "AEROBOAT."

A surprise is promised in the new Hamilton aeroboat, which is now nearing completion. It is of the motor-in-the-hull type, and has many new features that should make it very popular the coming season. One of the features will be the standardized construction system in building. The makers intend to build them in groups, and all alike, instead of each and every machine a new model with several experiments attached. By this system cost of production will be greatly reduced, without in any way interfering with the quality. Should a customer require a spare part, it will be ready to install without a lot of fitting. The Hamilton people are also establishing a chain of agencies that will be at the service of the owner of the Hamilton product. In fact, they are modeling their organization along the lines of modern automobile practice.

Aeronautics Issues Semi-Monthly

BEGINNING with the first of 1914, AERONAUTICS will be issued twice a month, on the 15th and 30th. The first January Number will appear January 15th; the second January Number will be mailed January 30th. Advertisements will appear every issue or every other issue as desired by advertisers. The price of single issues will be 15 cents.

THINGS are moving more swiftly these days. The "slump" in aeronautics in this country is over. Whatever of industry there is is now solid and growth from now on will be real. "There will be more done in the next 18 months than has been done to date in aeronautics."

THE aeronautical manufacturers are most enthusiastic over the announcement that AERONAUTICS is to be a semi-monthly, the first in this country. "If any magazine gives value received it is AERONAUTICS." "We think the time is about ripe for such a step and no doubt will make AERONAUTICS more popular than ever." "It will increase the field of AERONAUTICS' usefulness to a great extent." With such whole-hearted support from the trade, and with the generous endorsement of the readers, which AERONAUTICS has always enjoyed, the future holds no limitations.

WILL my good friends, the readers, show their so often expressed appreciation of the magazine in an active way? Will you, friends, see that your town library subscribes? If you know of someone who may be interested in the magazine, will you send me his name for a sample copy? Will you induce your clubs' secretaries to subscribe to AERONAUTICS? If there is an educational institution in your town, will you say a word? Wherever you can find an opportunity, will you boost for aeronautics and the magazine?

If the Hamilton aeroboat is anywhere near what the builders claim, the price of $2,150 should make them very popular. Their years of experience have taught them that economy in construction and a reasonable selling price are required to interest the majority of prospects. They will market both two and three-seat aeroboats, the first lot of which are now under construction. One of their machines, which was sold through advertising in AERONAUTICS to H. W. Kenzie in New Zealand, was flown by a sixteen-year-old boy for fifteen minutes the first time in the air.

FOWLER'S INSPECTION FLIGHTS.

Robert G. Fowler deserves no little credit for the good flights he has been making during his contract to inspect the power wires of the Great Western Power Co. Two notable flights were of 175 and 200 miles respectively. It took 2 hours and 17 minutes to make 70 miles during the first flight mentioned, on account of the high wind. The other course necessitated flying with his passenger over Mt. Diablo, at an altitude of 5,000 feet.

AN APPRECIATION.

Mr. E. L. Jones, Editor AERONAUTICS.

Dear Sir: Will you be good enough to give space to this inadequate expression of my thanks to those two staunch and steady, tried and trusty friends who permitted me to use their names and gave their time in the important and patriotic campaign started for a certain purpose, of which many readers of this magazine are aware. These gentlemen, Mr. C. J. Hall, of the Union Savings Bank and Trust Co., and Mr. W. W. Gibbs, vice-president of the German-American Savings Bank, Los Angeles, gave their services for the national campaign as if they knew what our European friends do in such campaigns. Service is the great thing in this world. It is to be hoped that the rest of us will do our part during the coming months. Sincerely yours,

C. W. SIRCH.

NAVAL AERONAUTICS—AIR CRAFT WILL TAKE THEIR PLACE IN THE FLEET.

The Secretary of the Navy has decided that the science of aerial navigation has reached that point where air craft must form a large part of our naval force for offensive and defensive operations. Nearly all countries having a navy are giving attention to this subject. This country has not fully recognized the value of aeronautics in preparing for war, but it is believed that we should take our proper place.

This is the policy that has been adopted. Captain W. I. Chambers, U. S. N., retired, in charge of aviation in the navy, is recognized as one of the leading men in this science in the world. Lieut. John H. Towers, U. S. N., an aviator of recognized ability, has had charge of the aviation camp at Annapolis, under Captain Chambers. He has contributed largely to the development of naval aviation by practical work in experimentation and in training personnel for flying. Several other officers and a detachment of men are working with Lieut. Towers. The navy has other qualified aviators and some students of aviation to assist in further development.

Captain Chambers will continue his excellent work at the Navy Department. Captain Mark L. Bristol has been assigned to the study and development of the art of aerial warfare for the navy.

It has been decided by a board of naval officers that Pensacola is the best location in this country for a naval aeronautical center. The Secretary has approved the findings of this board, and selected the naval station at Pensacola, Fla., for a naval aeronautical station. The aviation camp at Annapolis will be transferred there, and a flying school, in charge of Lieut. Towers, will be permanently established. The battleship Mississippi has been detached from the reserve fleet and assigned as aeronautical station ship at Pensacola. She will sail in a few days. Lieut. Commander H. C. Mustin, a qualified aviator, student of aviation and an officer of much mechanical ability, has been assigned to special aeronautical duty on board the Mississippi. He is to take up the problem of the work of air craft at sea with the fleet.

This new impetus to aeronautics in our navy is only the beginning of a program that has been mapped out. The flying school at Pensacola, working with the Mississippi, will produce trained personnel and evolve a complete system of training. A scheme for systematically carrying out experiments and tests and bringing outside experts into close touch with our work will be developed. The designers of air craft in the United States, and of the world if possible, will be invited and induced by substantial financial assistance to provide for our navy the best type of air craft obtainable. The question of airships has already been considered. The purchase of airships for experiment and the training of personnel will be taken up soon. The manufacture of air craft in this country will be encouraged.

When the Navy Department goes to Congress for financial assistance, it will not be based upon theories, but upon actual experience and practical results.

BEACHEY'S LOOP RECORD.

During the month more than 100,000 people have paid to see Beachey fly. From Oakland and Los Angeles, he starts for a tour of the world via Australia, stopping at Honolulu.

From Dec. 13th to Jan. 1st Beachey flew in five cities, looping the loop some thirty-eight times and flying upside down twenty-seven times.

IMPORTS AND EXPORTS.

Imports of 'Planes and Parts.	
October	$ 108
For 10 months ending October 1	19,625
Exports of Domestic 'Planes and Parts.	
October	$ 1,015
For 10 months ending October 16	64,175
Exports of Foreign 'Planes and Parts.	
October	$ 900
For 10 months ending October 2	11,232
In Warehouse.	
October 31—Three	$7,623

NO SPEED FREAKS IN 1914 RACE.

The regulations governing the 1914 race for the International Cup, which will be held in France over a 200-kilometre course, provide that competing machines will have to compete in preliminary tests over a straight line out and back of about two kilometres, at a mean speed of not more than 70 kilometres (43¾ miles) an hour. In this test the machine must carry sufficient petrol and oil to cover the whole of the course of 200 kilometres. Three attempts will be allowed each competitor. After this qualifying test has been passed, no modification may be made to the machine. Repairs will only be allowed with the permission and under the control of the stewards.

SETS NEW ALTITUDE RECORD.

Saint Raphael, France, Dec. 27.—The world's altitude record for aeroplanes was broken to-day by Georges Legagneux, who ascended to a height of 20,295 feet in his monoplane. The duration of the flight was 1 hour and 35 minutes.

FIVE NEW ZEPPELINS.

Five new Zeppelins are to be ready by April; two for the Germany army, two for the navy, and the fifth is for passenger service on Lake Constance.

AUTO MOTOR RUNS 14 DAYS.

Of the accessories fitted to the Moline-Knight sleeve-valve engine, which on January 2d completed the 336-hour test, none shows up more prominently than the Bosch magneto and the Bosch plugs. These important attributes of the engine were subjected to a difficult trial, having passed through the 336-hour test, the preliminary runs, the horsepower test and the 5-hour economy test without being touched or adjusted in any manner whatsoever, and neither the magneto nor the plugs missed an explosion during the entire time.

One gains an idea of what the ignition system performed during the 336-hour test when it is known that over 44,352,000 sparks were produced by the magneto and 11,088,000 sparks passed across the

AERONAUTICS

Published Semi-Monthly by Aeronautics Press
122 E. 25th St., New York
Cable: AERONAUTIC, New York
'Phones 9122 / 4413 Madison Sq.

A. V. JONES, Pres't — ERNEST L. JONES, Treas'r-Sec'y
ERNEST L. JONES, Editor — M. B. SELLERS, Technical Editor
HARRY SCHULTZ, Model Editor

SUBSCRIPTION RATES
United States, $3.00 — Foreign, $3.50

No. 77 — JANUARY 15, 1914 — Vol. XIV, No. 1

Entered as second-class matter September 22, 1908, at the Postoffice, New York, under the Act of March 3, 1879.

¶ AERONAUTICS is issued on the 15th and 30th of each Month. All copy must be received 6 days before date of publication. If proof is to be shown, allowance must be made for mailing.

¶ Make all checks or money orders free of exchange and payable to AERONAUTICS. Do not send currency. No foreign stamps accepted.

electrodes of each of the four plugs. It took just 88,704,000 separate movements of the magneto contact breaker to produce these sparks.

This is an unprecedented performance. The motor ran without any stop whatever for 336 hours, with wide-open throttle and set spark, at an average speed of 1,117 revolutions per minute, giving an average brake horsepower of 38.3. The lowest horsepower reading for any fifteen-minute interval during the entire 336 hours was 36.4.

At the end of the 336 hours, without stopping the motor, the speed was increased and the motor developed an average of 53 brake horsepower for a period of one hour, while averaging 1,670 revolutions per minute.

Prior to and following the endurance run, a series of short tests were made, with wide-open throttle and spark set for maximum power, to determine the power, friction and fuel consumption of the motor at various speeds. The same carbureter setting employed during the endurance run was used in these runs. The maximum brake power shown in these tests was 53.6, at 1,682 revolutions per minute.

The motor was dismantled before and after the test to permit careful inspection. At the end of the test the parts of the motor were, without exception, in excellent condition. There was no perceptible wear on the bearings, sleeves or other parts.

ST. PETERSBURG-TAMPA AIRBOAT LINE.

The St. Petersburg-Tampa (Fla.) Airboat Line announces its 1914 schedule. Boats leave St. Petersburg daily at 10 a. m. and 2 p. m., returning from Tampa at 11 a. m. and 3 p. m. The popular captain, Tony Jannus, remains on the bridge this year as usual. A change has been made in rates, however—quite a reduction, in fact, from previous schedules: $5 per trip, round trip $10. Passengers are allowed 200 lbs. gross, including hand baggage. Excess is charged at $5 per 100 lbs., minimum charge 25 cents. Express rates for packages, mail matter, etc., $5 per 100 lbs., minimum charge 25 cents. Fat men over 200 lbs. pay for excess baggage.

Captain Jannus began this season's daily trips from St. Petersburg across the water to Tampa on January 1, Mayor Pfeil, of the former city, bidding the privilege of the first flight up to $400, while N. A. Mitchell paid $175 for the second. The over-water trip takes from 19 to 23 minutes.

The new vessel is the product of the Benoist air ship building plant at St. Louis and follows standard commercial packet lines. Little attention has been given to luxuries; in fact, there are no staterooms at all on this boat.

Tony Jannus made himself known to New Yorkers in the race around Manhattan on Columbus Day last when he piloted to its dock the good ship Benoist in a 43 mile wind. With progress in these air cruiser packets, we will doubtless soon come to vessels more or less analogous to the old luxurious steamers of 1913, which oldest inhabitants will remember with fond recollections.

Entering the above in my diary after an interesting discourse with Mr. Foss, the engine builder, to bed, albeit I would much rather stay up awhile and see the new mail boats with their great lights make a patchwork of the upper air.

AERO MAIL BILL MAY BE KILLED.

The bill to provide for experimental carrying of mails in certain parts of the United States where it now takes many days for the delivery of pouches is meeting with strenuous opposition on the part of hard headed Congressmen. The greater need is for aeroplanes and dirigibles for the Army and Navy and efforts should be concentrated towards proper appropriations in this respect rather than for mails.

BEACHEY FLIES INSIDE BUILDING.

Lincoln Beachey again demonstrated his own superior technique and at the same time evidenced the great accuracy with which he handles his Curtiss biplane, when he flew around inside Machinery Hall at the Panama Exposition grounds in San Francisco last week. He started his flight with his "loop" machine (see AERONAUTICS for November, 1913) outside the building, then swooped through the doorway and around the great building. Machinery Hall is some 900 ft. long and the arches are 75 ft. wide. In flight Beachey is said to have had no difficulty, but in landing it is reported he ran into a big net, set at one end of the hall for his protection, and slightly damaged his machine. He was quite uninjured and the machine so slightly that it was ready for the exhibitions he gave next day. Beachey is booked to start round the world next week.

CURTISS 'PLANES WITH AUTOMATIC STABILIZER.

Two Curtiss aeroplanes equipped with automatic stabilizers are entered in the $77,200 prize contest to be conducted in France, beginning in February, by the Aero Club of France for L'Union pour la Securite en Aeroplanes (see p. 152, August issue). One of the machines is now in Paris, while the other is being prepared here for final tests and will be shipped soon.

Mr. Curtiss, working with the United States Army aviation corps, and the U. S. Navy aviation corps, and the Sperry gyroscope company, has devoted much time to the problem since 1912. Tests made during the past season were so satisfactory that the device was entered for the competition inaugurated by the Union Pour La Securite en Aeroplans several months ago. More recently a second Curtiss machine, to be equipped with another device which has passed the severest tests, was entered and will be shipped in time for the elimination trials. Little publicity has been given the trials here.

MACKAY TROPHY WON AT RECORD BREAKING SPEED.

Flying 58 miles in 46 minutes, locating and accurately describing an advancing "enemy," and finishing the flight with a glide of 8 miles to within 25 ft. of a prearranged landing mark, won the Mackay Trophy for Lieutenant Joseph C. Carberry, Sixth Infantry. The flight was made in the latest Curtis military tractor delivered to the U. S. Army aviation corps at San Diego, equipped with a Curtiss 90-100 h.p. motor, on December 30th.

Lieutenant Fred Seydel, C. A. C., accompanied Lieutenant Carberry on the record breaking flight as official observer.

Flying at an altitude of 3,500 feet the aviators searched the country for the expected enemy and when well over Point Loma discovered the troops which had left Fort Rosecrans at 7 a. m. Indicating the number of troops, their marching speed and direction on the map, they swung about and flew back to Encinitas.

Orville Wright says flying now is fool-proof. This is gratifying—because it is the only thing that is.—*N. Y. Eve. Sun.*

Haldeman von Figyelmessy is doing some good work on Staten Island with the Curtiss engine tractor of O. E. Williams. Fig.-etc. doesn't at all mind turning over in the air a couple of times with a loose engine bed and getting thrown out. Never heard that it was part of the Hammondsport course to fall three stories on one's head to get a degree. Perhaps Haldeman von F. was only doing post-graduate work.

NAVY RECEIVES MORE FLYING BOATS.

Three more Curtiss flying boats and an O. W. L. have been delivered to the U. S. Navy. The C-3 was tried Dec. 7 at Hammondsport and showed 60 m.p.h., minimum 45 m.p.h., with Lieut. B. L. Smith and Ensign Chevalier in the machine. She readily carried three people and 25 gallons of gas, total weight 500 lbs. Left the water inside of 1,500 ft., climbed 1,500 ft. in 13 minutes and made an endurance run of an hour. This machine was packed for transport with the marines to Culebra for winter maneouvres.

The C-4 and the C-5 were tested at Annapolis on Dec. 24. The maximum speed of each was, respectively, 64.157 and 59.052 m.p.h. The minimum speeds were, respectively, 45.033 and 49.672 m.p.h., the apparent shortcoming in C-5 being due to lack of time to adjust motor. C-5 left the water in 1,100 ft. and climbed at the rate of 143 ft. per minute. The oil consumption was 5 pts. per hour and the fuel consumption 7.8 gals. per hour. C-4 left the water in a run of 1,000 ft. and climbed at the rate of 150 ft. per minute to 1,500 ft. Oil and gas consumption, respectively, 4 pts. and 8 gals. per hour.

The O. W. L. (over land and water) machine, the E-1, is a modified Curtiss hydroaeroplane, fitted with wheels, running in rectangular slots in the pontoon. These wheels can be drawn up out of the way and fixed stationary by a lever. This machine has also gone to Culebra. The first tests of this experimental type, hastily constructed, were highly satisfactory, showing a speed range of 44 to 65 m.p.h., with surprising maneouvering qualities in the air and splendid adaptability for work on both land and water.

BOOKS RECEIVED.

FLIEGERKURZ. Leitfaden für Militär-und Zivilflieger, von Josef Flassig, k. u. k. Leutnant und Feldpilot der oesterreichischen Luftschifferabteilung. 16mo, cloth, 164 illustrations and tables, charts and drawings, published at K. 7.20 by R. v. Waldheim, Jos. Eberle & Co., Andreasgasse 17, Wien VII, Austria.

Contents include: DIE PHYSIKALISCHEN UND METEOROLOGISCHEN EIGENSCHAFTEN DER LUST—Physikalische Eigenschaften, Der Luftdruck, Die Lufttemperatur, Der Wind, Die Luftfeuchtigkeit. DER LUFTWIDERSTAND—Senkrechter Luftstofs, Schiefer Luftstots, Stirnwiderstand auf Stäbe, Anderung des Luftwiderstandes durch die Form des Körpers, Widerstände von Streben und Seilen, Wirkung der stromenden Luft auf gewolbte Flachen, Versuche von Lilienthal, der Gottinger Anstalt und der Versuche von Eiffel, Der Luftwinderstand bei Drachenfleigern, Die Berechnung von Propellern. DIE FLUGMASCHINE—Der Rumpf, Die Steuerung, Die Die Kolben, Die Kolbenringe, Das Motorgehause, Verwindung. DER BENZINMOTOR—Die Zylinder, Vorang bei der Zundung. Zundvorrichtungen, Die Wichtigsten Vergastertypen, Die Arbeitsweise des Benzinmotors. Instandhaltung des Motors und Reparaturdesselben, Visitierungstabelle, Storungen am Motor, Die Typen der Aeromotoren, Bremstande. BENZIN UND OL—Die chemische Untersuchung der Brennstoffe, Die chemisch-physikalische Untersuchung der Schmiermittel. MATERIALKUNDE—Das Holz, Eisen & Stahl, Zink, Kupfer, Blei, Zinn, Nickel, Aluminium, Legierungen, Zugfestigkeit der Metalle und deren Legierungen, Zugfestigkeit von Drahten, Das Loten, Das Schweifsen, Das Harten. FESTIGKEITSLEHRE—Zulassige Spannungen, Festigkeit gerader Stabe, Zusammengesetztre Festigkeit, Belastungsfalle beim Flugzeugbau. DIE SCHULE DES FLIEGENS—Dienstordnung und Direcktiven fur den Pilotenkurs, Die Haftpflicht fur die Flieger, Die Ausbildung im Fliegen. FLUGTECHNISCHE PHOTOGRAPHIE ANHANG—Organisatorische Bestimmungen fur die Luftschifferabteilung, Meldeformular, Die Sportkommissare fur Flugmachinen, Die Prufungskommissare, Die neuen Bestimmungen, Die Federation Aeronautique Internationale, Lizenz.

COURT GIVES WRIGHT DECISION

New York, Jan. 14.—Yesterday the U. S. Circuit Court handed down an opinion in favor of the plaintiff in the Wright-Curtiss suit. Full abstract of decision in next issue.

FLYING AT PANAMA-PACIFIC.

The flying at the Exposition grounds has been truly wonderful. Every Sunday there are at least six hydros, and sometimes ten, giving beautiful demonstrations of the modern water craft, its efficiency, speed and reliability. "Beachey's stunt is wonderful. At first I did not think much of it from hearing others talk about it, but, believe me, when I say it, is worth walking miles to see."

At the Paris Exhibition, December 25th, there were 65 pieces of apparatus on which ignition systems were fitted. Of these 65, 56, or 86%, used the Bosch magneto. The balance was divided among three other makes of ignition systems.

In the national award for the best distance covered in 24 hours, Bosch-equipped aeroplanes made a clean sweep, winning all prizes from 1 to 6, inclusive.

Prize 1 was won by Stoeffler—Aviatik monoplane, Mercedes engine, Bosch magneto. Stoeffler covered 2,079 kilometers, about 1,291 miles, which is a world's record. His prize was 100,000 marks, or $25,000.

The second prize, Schlegel—Gotha monoplane, Mercedes engine, Bosch magneto. Distance, 1,497 kilometers. Prize, 60,000 marks.

Third prize, Caspar—Gotha Hansa monoplane, Mercedes engine, Bosch magneto. 1,381 kilometers.

Fourth prize, Thelen—Albatros biplane, Mercedes engine, Bosch magneto. 1,373 kilometers.

Fifth prize, Kastner—Albatros monoplane, Mercedes engine, Bosch magneto. 1,228 kilometers.

Sixth prize, Geyer—Aviatik biplane, Mercedes engine, Bosch magneto. 1,173 kilometers.

On Board S. S. Coamo,

Nov. 28, 1913.

Mr. Jones,

Editor of AERONAUTICS,

New York City.

My Dear Sir,—Read with regret that Mr. Brown is retiring from aviation. Perhaps Mr. Stevens can use him as an assistant on the bee farm he became interested in at Rio Pedras, Porto Rico. He told me personally when I met him on the island that he would supply much honey to the world by his millions of bees. I wish both of those gentlemen luck, and hope they will not get stuck as my friend Mr. Beachey did with his sugar. Perhaps Mr. Stevens' idea is to have the bees carry the honey from the sugar cane that Beachey left behind. Leave it to him.

With my best wishes to you, I beg to remain,

Cordially,

(Signed) ANTONIO MORALES.

JANUARY MONTH-END EDITION

AERONAUTICS

COMBINED WITH "FLY" MAGAZINE

XIV. No. 2 JANUARY 31, 1914 15 Cents

Ray V. Morris and Photographer Estey Flying over Narragansett Bay in Gerald Hanley's Curtiss Flying Boat

The New Benoist Flying Boat in Action

BENOIST

ANNOUNCEMENT

The Benoist School of Aviation will open on January 1st, at St. Petersburg, Florida. The school will be under the personal supervision of Tom W. Benoist and Tony Jannus. We will also conduct the first regular schedule passenger-carrying air line in the world, St. Petersburg to Tampa, Fla. Students who want to join the school and prospective agents who want their territory for the exclusive sale of our flying boats will do well to address

BENOIST AIR CRAFT COMPANY

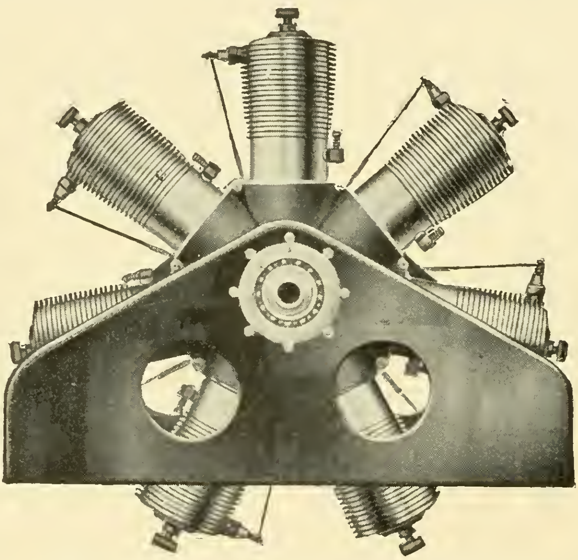
St. Louis, Missouri or St. Petersburg, Florida

---

50 H.P.
160 POUNDS

GYRO MOTOR

80 H.P.
207 POUNDS



Built of Nickel Steel and Vanadium Steel Throughout

Endurance Flying Record to Date, 4 hrs., 23 min.

From

"FLIGHT"

July 26th, 1913

"Some may say—to the obvious benefit of the Company whose representatives have adopted his very practical method of calling attention to the GYRO engine (50 h. p.) that it is *all due to the motor*, which probably develops about three times as much power as the machine requires for the purposes of straightforward flight."

Send for Catalog

THE GYRO MOTOR COMPANY, 774 Girard Street, Washington, D. C.

ALL MARINE FLYERS

Should investigate the merits of the **Three-Bladed Paragons.** *Smaller Size* than corresponding two blades, with fine lines of design, make them turn more freely. *Free turning* enables them to carry higher pitch. The added blade gives them a *stronger hold* on the air.

RESULTS:—**Less Vibration — Full Turning Speed — Higher Pitch Speed = Smaller Slip—Faster Flying—Stronger Manoeuvering—Safer Handling and Control.**

Uncle Sam uses three-bladed Paragons almost exclusively in his Navy Boats—There's a *reason* and Paragon price economy besides.

There are *questions* in your mind. Write to us for the *answers* intelligently stated and illustrated by photographs. Full *brass* blade protection at only nominal cost.

AMERICAN PROPELLER CO., 243-249 E. Hamburg St., Baltimore, Md.

U. S. NAVAL AERONAUTIC SERVICE

The Navy's Board of Aeronautics, convened under Navy Department Orders, composed of Senior Member Captain W. Irving Chambers, Commander C. W. Brittain, Commander S. S. Robison, Lieut, M. H. Simons, Naval Constructor H. C. Richardson, Lieut. J. H. Towers, First Lieut. A. A. Cunningham, has reported a very comprehensive plan for the organization of an adequate mobile Naval Aeronautic Service, to include a great aeronautical centre, with a goodly equipment of aeroplanes and dirigibles as a starter.

The plan proposed shows that something is being accomplished in our Navy, just about the time someone has alleged it to be asleep. If put in practice, our naval aeronautic equipment will be second to none. Even the over-boosted foreign naval air work will be eclipsed. Some of the work already done by the boats and the new type O. W. L. machine. It only remains for Congress to supply the asked-for funds, to which end the efforts of those interested should be bent, rather than to picking flaws and pulling political wires. It is understood, however, that there is money enough available for proceeding with the main part of the work at once.

The Board recommends that Congress be asked to appropriate as early as possible $1,297,700. This covers estimates as follows:

(a) 50 Units of aeroplane, outfit, spare engines and parts (fleet service)	$500,000
(b) One 10,000 cubic meter dirigible, outfit and parts (fleet service)	173,000
(c) 1 Fixed and 1 portable hydrogen plants (Pensacola plant)	17,000
(d) 1 Double floating dirigible shed (Pensacola plant)....	90,000
(e) 1 Mooring mast (Pensacola plant)	1,200
(f) 1 Combination captive and free balloon (Pensacola plant)	800
(g) Fixed and portable aeroplane sheds (Pensacola plant)..	18,000
(h) 3 Motor boats, 3 tractors, 2 trailers (Pensacola plant).	39,400
(i) Gasoline storage (Pensacola plant)	4,000
(j) Maintenance	100,000
(k) 2 Dirigibles, Vedette type (Pensacola plant)	85,000
(l) 6 Units of aeroplanes, outfits, spare parts, etc.; 6 tents; 4 knockdown trucks (advance base outfit)........	92,300
(m) One 2,200 cu. m. dirigible and accessories (advance base)	177,000
	$1,297,700

ONE GREAT AIR CENTRE MOST ECONOMICAL.

Based on the experience of foreign countries, the Board has confined its attention principally to the establishment at one suitable aeronautic centre—at the Pensacola (Florida) Navy Yard—for reasons of climate, convenience and facilities.

Immediate additions are planned, as provided for in the foregoing schedule, in which provision is also allowed for a meteorological observatory and equipment, as standard plans for building kites to be furnished to all flagships, library and amusement.

AEROPLANES ON ALL SHIPS.

Aeroplanes to be used from ships of the fleet and from auxiliaries. One aeroplane with spare motor, parts, etc., to be placed on all battleships as soon as practicable. Auxiliaries to carry stores and supplies. Officers to be instructed with machines of the same types, pilots to be available for either land or water flying, standard type of control to be used, desirable to develop a single type of aeroplane to meet all requirements.

A FLYING SCHOOL.

Flying school to be at Pensacola, for reasons previously stated and in order to cooperate with the fleet, maintained in two categories:

SEA SECTION for advanced practice and experiment. A reserve ship to be used as a mobile advanced flying school, ror testing devices to be employed in installation and use of aeroplanes on battleships, and for such experiments as launching catapult, hoisting apparatus and stowage. This ship would also be used for stores, barracks and in conjunction with dirigible flights at sea to make such tests as the practicability of replenishing an airship with fresh supplies of fuel and hydrogen, the accuracy of bomb dropping appliances, and the tactics to be employed in contests between aeroplanes and dirigibles. Personnel to consist of commanding officer, three air pilots and usual complement of ships in reserve.

LAND SECTION in charge of an officer of the Aeronautic Division. Equipment as per schedule. For instruction and practice.

COURSE OF INSTRUCTION AND DUTY.

Students and air pilots will be given instruction in practical work on machines, theoretical study, instruction in aeroplane and dirigible operating to qualify for naval air pilot certificate whose holders are considered competent for sea service. Those recommended for advanced instruction in aeronautical engineering to be sent each year to the institution giving the best course, this post-graduate instruction to be later conducted at the Naval Academy if possible.

One or more air pilots each year to be selected for experimental work in the Aircraft Factory and the National Laboratory, or sent abroad for foreign study.

AERONAUTIC SERVICE WITH FLEET.

When certified pilots have been transferred to the Sea Section they are available for transfer to a ship of the fleet and to be in charge of the aeroplane attached to that ship.

BALLOONS, DIRIGIBLES AND ACCESSORIES.

Four dirigibles to be bought: one for expeditionary service with the fleet, one for use at an advanced base and two of Vedette class for Pensacola plant, as listed previously in the schedule. A mooring mast which has been satisfactorily used in England will be adopted for mooring the airship at the advanced base, or two dirigibles may be housed in the double floating shed which is provided for. Study to be commenced on a special auxiliary ship in connection with the aeroplane auxiliary, starting on the basis that it must accommodate a 10,000 cubic meter dirigible.

Experiments will be made with a combination free and captive balloon for preliminary instruction of dirigible pilots and to ascertain of what service they may be with the fleet. It is suggested that experiments be also made with hot air balloons.

Laboratory work of the Navy to be carried on at the Washington Navy Yard in connection with the model basin and the National Aeronautic Laboratory.

PERSONNEL OF NAVY AERONAUTIC CENTRE.

The personnel of the Navy Aeronautic Centre to consist of: the Commandant, over two divisions (AERONAUTIC—with aids, officers, enlisted personnel of Navy and Marine Corps to carry on instruction both with dirigibles and aeroplanes; OPERATIVE—comprising staff to operate the Yard for purposes of Aeronautic Centre); three aids (instructors), Senior Aid to be Executive Officer of Yard and in charge enlisted men; 1 Gunner, 1 Boatswain, 1 Carpenter as assistants to Executive Officer; 1 Marine Officer commanding Marine Guard distinct from Marine Corps personnel of the Aeronautic Department.

DEPARTMENT ORGANIZATION.

An Air Department in the Navy Department to be established under the Division of Operations in charge of a Director of Naval Aviation, with assistants and authority and responsibility to carry the organization into effect. The Director to proceed with the organization of a Naval Air Service. This Air Department not to be a separate department, as such is deemed unnecessary and in conflict with present legal status. Great stress is laid on this point with the object of maintaining harmonious operation with the present simple and efficient system in the Navy Department to obtain efficiency in the general results.

The task of co-ordination in the Navy is made possible through the assistance provided for in the Council of Aids, each looking after a natural division of the labor, with authority to advise but not to execute. The system is theoretically perfect. The Board urges that the Secretary of the Navy have one representative especially engaged in aeronautics, with an office for meetings of representatives of the bureaus, for records, files, reports, etc. Aeronautics has heretofore been in charge of the Bureau of Navigation, but this Bureau cannot spare the time to specialize on aeronautics, so that the Board believes the establishment of an office of Naval Aeronautics under the Secretary's office is essential.

OFFICE OF NAVAL AERONAUTICS.

To be in charge of Director of Naval Aeronautics, with rank of Captain if practicable, to co-ordinate the work for Secretary of Navy in co-operation with necessary assistants representing the Bureaus. Assistant Director—an officer with aeronautic experience, of rank of Commander if practicable, to represent Director in absence. Other Assistants representing each: Bureau of Navigation, Construction and Repair, Steam Engineering, Ordnance, Marine Corps. One of these assistants to be an air pilot. All assistants to form a board or council to investigate all problems connected with development, maintenance and instruction of Naval Aeronautic Service, in addition to their regular Bureau duties, and to assemble at the Office of Naval Aeronautics whenever desired.

TRAFFIC MANAGER BENOIST AIR LINE ISSUES OPERATION SHEET.

We have just received the operation sheet of the Benoist Airline at St. Petersburg, Fla., for the first ten days of its work.

It would seem that not only is the airboat practical for commercial purposes, but it is more reliable and has a greater earning power than the automobile or motor boat.

The following figures can be taken from the operation sheet which appears herewith:

Number of trips made, 26; number of passengers carried, 52; hours flown, 12 hours, 43 minutes, 30 seconds; miles flown, 682; gallons of gasoline consumed, 170½; gallons of lubricating oil, 19½.

This makes 1,364 passenger miles flown in these ten days, and 25 passenger hours.

When we figure that 682 miles was made in this ten days in regular commercial work and multiplying this by three, equals 2,000 miles for one month.

The usual pleasure automobile seldom ever runs more than 1,200 to 1,500 miles a month, and then it is supposed to be kept on the road practically all the time. Of course, in a four-passenger machine this runs the passenger mileage up as high or higher than in the airboat, but the usual auto taxicab used in commercial work seldom ever makes more than 900 miles in one month, which at three passengers carried continuously would only equal 2,700 passenger miles in one month, while the airboat made practically that many passenger miles in twenty days.

This is a really remarkable showing when you consider that the airline at the present time has only one boat at St. Petersburg, and it is necessary to keep this in service all the time. Also this boat has been used for over six months, having been put into service on July 4 and kept in exhibition work all that summer and fall, giving exhibitions at Put-in-Bay, Grand Rapids, Keokuk, Paducah and many other places, besides several long river runs on the Mississippi, Illinois and Ohio Rivers.

It has never had an overhauling since it left the factory, but, of course, is not in as good condition as a new machine would be.

Two more passenger carrying planes, however, were shipped on the 15th inst to St. Petersburg, and it is expected the operation sheet for the next period of ten days will show an even more successful business.

KANSAS CITY GETS BIG BALLOON RACE.

The international balloon race this year will be started from Kansas City, Mo., on October 6, this city having agreed to offer $7,200 in prizes, allow free gas to the entrants and make all arrangements for handling the event.

WRIGHT-CURTISS LITIGATION ENDED

PATENT UPHELD

On January 13, 1914, Judges Lacombe, Cox and Ward, of the U. S. Circuit Court of Appeals, handed down the final opinion in the Wright-Curtiss suit.

The present opinion merely confirms the previous one of Judge Hazel in this case and that of Judge Hand in the Wright-Paulhan litigation. In part, it says:

"We are in full accord with the reasoning by which * * * (Judge Hazel and Judge Hand) reached the conclusions that the patent in suit is a valid one, that the patentees may fairly be considered pioneers in the practical art of flying * * * and that the claims should have a liberal interpretation. * * * That the third claim, when liberally construed, has been infringed seems too plain for argument. As to the other claim, in which the vertical rear rudder is an element we are satisfied from the testimony, as was the court below, that during some parts of their flight defendant's machines use the rudder synchronously with the wings so that by their joint action lost balance may be restored, or a threatened loss of balance be averted. Such use of the rudder constitutes infringement and a machine that infringes part of the time is an infringement, although it may at other times be so operated as not to infringe."

For a period of five years the patent suit of the Wright Company against Glenn H. Curtiss and the defunct Herring Curtiss Company has been litigated. The last hearing was on November 6 and 7, 1913, in New York. The deliberations of the three judges sitting took until January 13, 1914, when the final opinion was handed down.

Readers of AERONAUTICS are aware of every step in this and the other suits brought in the upholding of the validity of the Wright United States patent through the reports and decisions printed in this magazine.

For arguments and the reasoning of Judges Lacombe, Cox and Ward, of the U. S. Circuit Court of Appeals, reference must be had to Judge Hazel's opinion printed in full in the March, 1913, number of AERONAUTICS and to Judge Hand's opinion in the Wright-Paulhan case, printed in the April, 1910, issue, which opinions, up for review before the appeal judges, are now confirmed.

It is not anticipated that the victorious Wright Company will deal harshly with its competitors, now that its privilege of granting licenses has been legally accorded. There would be no advantage accruing from forcing others to close down. The greater the competition, the greater the number of 'planes produced. A thousand aeroplanes on which a hundred thousand dollars in royalties have been paid are more to be desired than the obtaining of the same sum on a hundred machines. It is not unlikely that arrangements will be made for convenient partial payments of back royalties and for granting licenses for further operations on the basis of moderate fees.

The one great result will be the bending of efforts to devise a system of balance which does not infringe the Wright patent. The Wright brothers have always contended that the adjudication of their patent would stimulate inventive genius. The litigation has already had its effect along this line. Patents have been applied for on devices to equalize the pressures on ailerons. There is an interference proceeding in this connection being prosecuted at this time. Others have entered applications or have received patents on systems which are alleged to be non-infringing.

The Wright patent has now been adjudicated in the United States and Germany and practically so in France. There is a small chance, however, that the suit in question may be again before the court. Appeal may be still taken to the United States Supreme Court, the highest in the land, under certain conditions. If carried to this court and not advanced on the list, that it would probably not come to trial for two or three years is the opinion of a lawyer.

The present status, therefore, is that manufacturers of aeroplanes which infringe the Wright patent in accordance with this decision are enjoined from further manufacture and sale unless an arrangement is made with the owners of the patent, the Wright Company, and while the decision applies specifically to the Curtiss type of machine only and indirectly to the Farman type, nevertheless the court rules that the claims of the Wright patent should be liberally construed and consequently modifications of either of these types would not evade the infringement in accordance with the broad scope of the decree.

As to the aeroplanes already manufactured and sold, unless a settlement be made direct, the procedure for the award of loss of profits or damage incurred, is to refer the entire matter to a Master who will take testimony in order to reach a conclusion for an award. This is slow process and dependent upon the evidence produced at the hearings before the Master as to the extent of the award. The statutes specify that the award can be for a sum equal to three times the damage sustained or profit lost by the owner of the patent and precedent in such cases limits the award to one of these conditions and not to both. If loss of profits are demanded, it must be proven that the infringing manufacturer actually made profits and was not doing business at a loss. If damage sustained is claimed, then it is a presumption that purchasers of the infringing article would have purchased the patented machine if the infringement had not been manufactured and offered for sale, but the defendant has the right to prove, so far as he can, that the differences in the two articles are of sufficient importance that purchasers of his machine would not have purchased the patented machine and would, therefore, have not purchased any. It is therefore impossible to anticipate the probable amount of award recommended by the Master and which is then transmitted to the court for final adjudication.

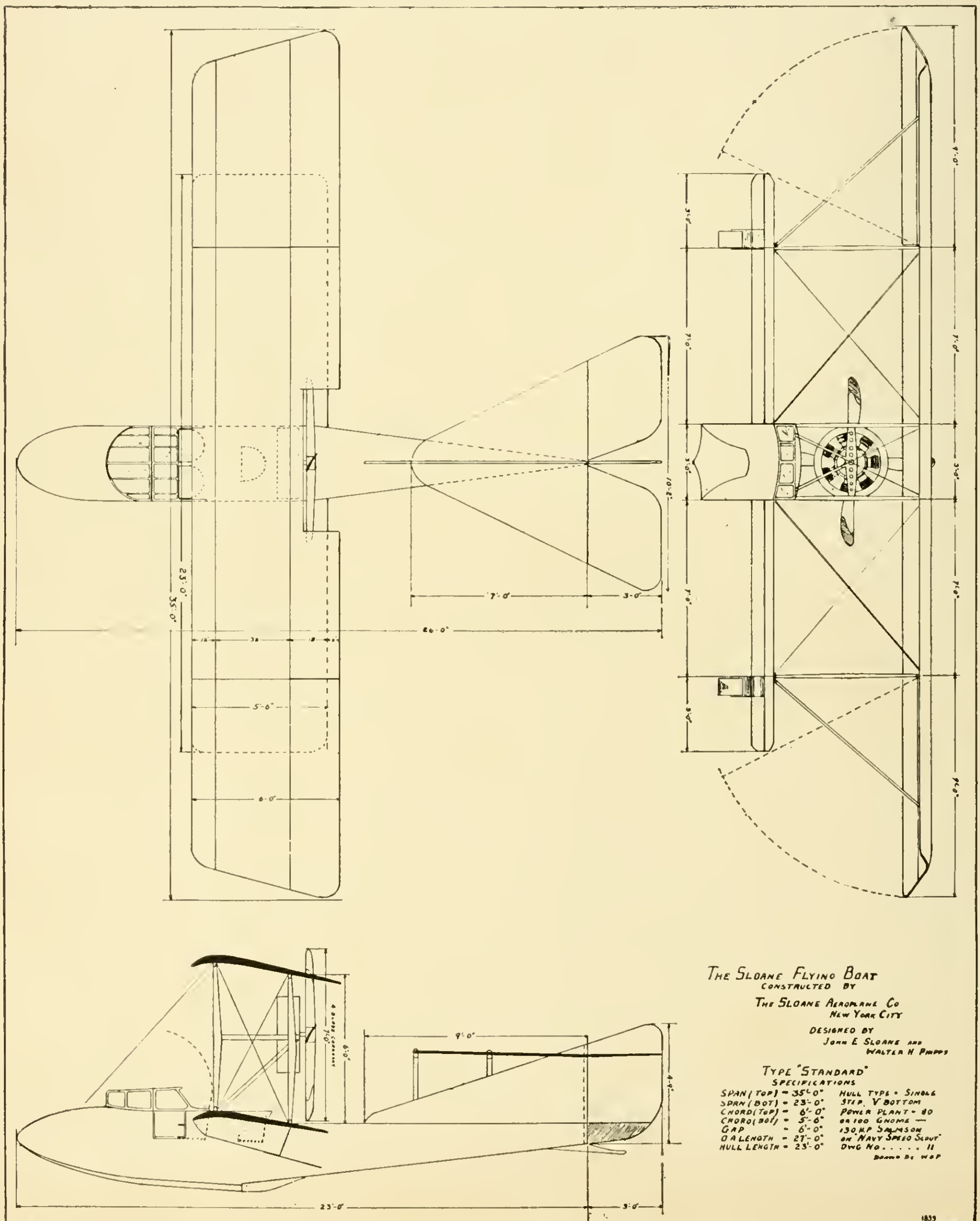
THE SLOANE FLYING BOAT

In accordance with its expansive policy for 1914 the Sloane Aeroplane Company of New York in addition to producing several new types of military monoplanes and biplanes is bringing out flying boats and bat boats [O. W. L.] designed and constructed to meet the most rigid naval requirements.

The first machine, of a sporting class, is now under construction.

General Dimensions—"Speed," "Scout" and "Sporting" Types—Span (top), 36 feet; span (lower), 23 feet; chord (top), 6 feet; chord (lower). 5 feet 6 inches; gap. 6 feet; over-all length, 26 feet. Surface—310 square feet on "Speed Scout" and "Sporting Type"; 405 square feet on "Sea Scout." Length of hull, 23 feet; width of hull, 36 inches; seating capacity—2 or 3 persons. Power plant—80 or 100 h. p. Gnome—or 130 h. p. Salmson on Naval (or good domestic motor of 100 h. p.) Speed Scout. Tank capacity—5 hours.

Hull is single step, built up of two-ply mahogany and canvas, copper-riveted, over a framework of ash and spruce ribs. Planing surface 36 inches wide, V-shaped. Eight water-tight bulkheads, fitted with inspection covers.



Nose of boat rounded off and streamlined. Ample space provided for wireless, marine and navigating equipment.

In the "Navy," "Sea Scout" and "Speed Scout" types, the rounded front is swept back to just in front of the operators' seats and is given a slight curl up at this point to form a wind and spray shield, which at the same time gives an absolutely perfect vision over the front and sides.

In the sporting type a permanent cabin is fitted, constructed of a light framework and entirely covered with transparent pyraline sheeting with its after part hinged so that it can be tipped forward for entrance or exit to the boat.

Two front seats are placed side by side; double control of the well-known Deperdussin type. Behind the operators' seats and immediately between the two planes is the passenger's seat.

Planes are of single piece construction, framed monoplane style. Top one spans 35 feet, chord 6 feet; the bottom one spans 23 feet, chord 5 feet 6 inches.

Strong diagonal bracing is used to truss the planes internally so that there is no bending or straining when in flight.

Only two uprights on each side of the engine section. This cuts down head resistance and permits the top extensions to be folded down when the machine is not in use.

For extended sea work these extensions modified somewhat will be folded from the operator's seat so that in case of emergency the wing area can be cut down while the craft is riding on the water.

Factor of safety of six to one allowed for. Main guy wires, 1/8-inch and 3/32-inch steel cable, doubled throughout and fitted with extra strong turnbuckles. All control wires doubled and extra strong.

Ailerons, 9 feet by 2 feet, operate in the usual manner, one up and the other down.

Rear stabilizing fin, 7 feet by 8 feet, is flat and set at a slight lifting angle. It is built in two parts and hinged to the vertical fin so that it can be folded down out of the way.

The two elevating flaps, which measure 3 feet deep, are spread out so that they operate in a position to give the utmost leverage and control, with the least possible drag and resistance.

The combination braces and control levers of the elevating flaps are made of steel tubing and are so fitted that by merely unfastening one turnbuckle all the bracing can be taken off intact and the steel braces folded down flat against the elevators and ailerons. The combination air and water rudder which is hinged to the rear of the boat and its vertical fin swings between the two elevator flaps. This is also fitted with collapsible braces.

The controls consist of the well-known Deperdussin wheel and foot lever arrangement. Pushing the wheel backwards and forwards operates the elevators, while turning the wheel to the right and left works the ailerons. Steering to the right and left is accomplished by the foot bar.

Main gasoline tank carried in the hull under the rear seats. Capacity has been figured out to allow for flights of at least five hours' duration. Tanks are of the pressure type and the air pressure is supplied to them by means of a small air driven propeller which operates through the speed of flight. Gasoline is forced to a small gravity tank situated in front and slightly above the carburetor. Air pressure gauge is fitted in front of the operator. A hand pump is fitted to supply pressure in case of emergency.

Either 80 or 100 H. P. Gnomes will be used as standard equipment. This can be varied, however, and domestic motors of 100 H. P. or more used if desired. In the Speed Scout type of machine a 130 H. P. Salmson Motor will be used. In all cases the motor is mounted midway between the two planes so as to bring the center of thrust more in line with the centers of resistance and weight.

WRIGHT-CURTISS SUIT.

L. J. Seely, of the Curtiss Aeroplane Co., made the following personal statement, in response to inquiries of AERONAUTICS, regarding his attitude on the recent decision:

"Any intelligent statement regarding the probable effect on the aviation industry in this country of the decision in the Wright-Curtiss case, would depend upon one's knowing whether this long drawn legal battle has been fought for moral or financial reasons.

"If the issue is a financial one, fought out to determine legal rights, any final decision, whether pro or con, must be helpful. The amount of money made in manufacturing aeroplanes in this country by any or all manufacturers has not been enough to keep the contestants busy for long in settling up accounts, and enabling them to start out with a clean slate and a knowledge of just what to expect.

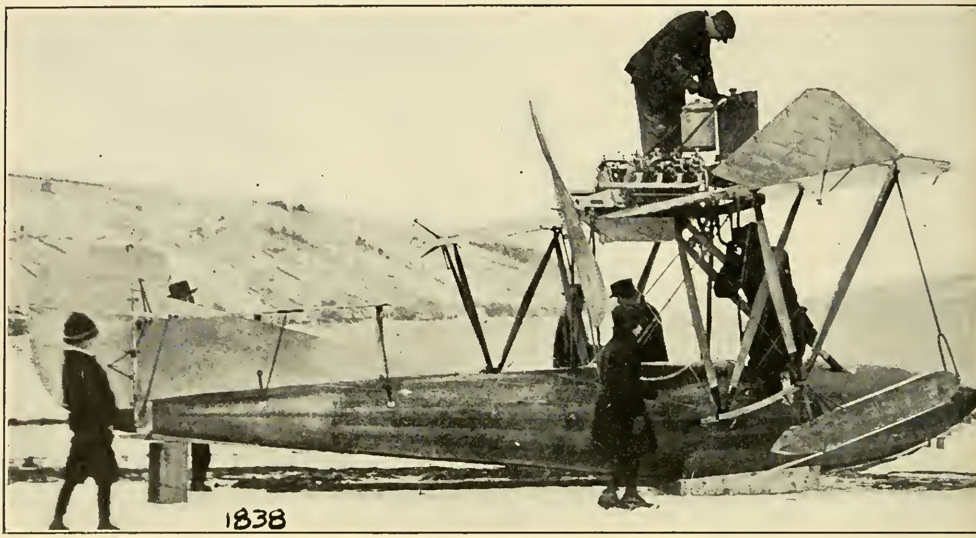
"The winners, one may assume, would establish a schedule of royalties calculated to bring them the best financial return; the losers would then decide whether they could better afford to pay the amount demanded, or set about perfecting and exploiting other means of lateral control; with the further alternative of pulling stakes and establishing their business in some European country where the Wright patents have been more precisely construed.

"If, on the other hand, personal pride, or personal animus, should override all other considerations settled conditions in the trade may be as far off as ever.

"Here at Hammondsport, where at this writing we have had definite word neither from Mr. Curtiss, nor from the Wright Company, we are proceeding on the assumption that business expediency will determine the issue."

DEATH OF HAMILTON.

Charles K. Hamilton, the first man to try to loop-the-loop, died at his home, 225 West 109th street, New York, on January 22, from hemorrhage. Hamilton was a New Britain, Conn., boy and started his air experiences riding kites for Israel Ludlow. He went into exhibition dirigible operating. Learning to fly a Curtiss machine in Hammondsport in 1908, he quickly was known all over the country as the most daring exhibition flier in this country. In attempting the loop in Seattle in 1909 the machine, for some unknown reason, dropped sidewise to the water when he reached the top of the loop. Hamilton's best known flights were from New York to Philadelphia and return, and from San Diego down into Mexico and return. For the past two years Hamilton has been doing little flying. Recently he has been connected with the Boland Aeroplane and Motor Company and was expected to fly the new water machine.



THE CURTISS MONOPLANE FLYING BOAT

In the monoplane flying boat designed by Glenn H. Curtiss for Raymund V. Morris, of New Haven, is suggested the breadth of the field Curtiss expects to cover with water-flying machines during the coming season. To date we have seen definite announcements of four quite distinct models; first, the new four-passenger mahogany boat; second, the O. W. L. type, designed for naval use; third, the tandem-seated, straight-sided, ocean-going naval type; fourth, this little single-seated speed machine.

In Morris' little racer there is not a single stick that matches up with anything previously turned out by the Curtiss plant. The hull is different, both in design and in method of construction; the wings are different in curve, in shape, in construction; even the radiator and propeller were designed especially for this trim craft. Only the Model O-X Curtiss motor is the same in all the different boats.

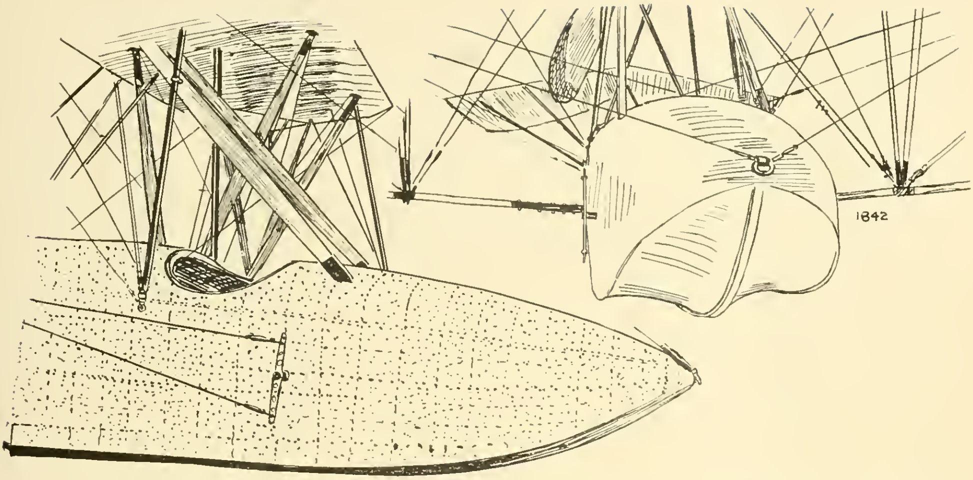
That it is a very efficient outfit may be gathered from the fact that the surfaces are lifting approximately ten pounds to the square foot, for with pilot and fuel the machine weighs very nearly 1,200 pounds, while the lifting surface is almost exactly 120 square feet.

Morris tried out the machine under every disadvantage. It was during the blizzardy weather of the early part of January, with a cold, rough wind blowing, and the mercury just above zero. Mist and spray turned immediately to ice and in a few minutes flying boat and flier were well coated. But the monoplane flew and it flew fast. It jumped off the water, running before the wind, and just where the operator did not want to rise with an untried machine and unfamiliar controls. Morris made four flights that day and several more later in the week for the benefit of a motion picture concern. His actual speed was not determined, for it was too cold to put out timers, but when the boat rushed by on the water it made you think of a rocket in a street-car track.

In form the hull suggests an expensive imported cigar; big at the end between your teeth, flat part of the way on one side, and tapering gently to nothing at the other end. Its principal dimensions are: length, 22 feet; beam, 30 inches; depth, 36 inches. The bottom, as far back as the step, is the new double Vee type prescribed on the new navy boats, C-3, C-4, C-5. The bow is pointed instead of square.

In construction, the hull is unique. The frame is a basketwork of ash strips, the ribs carried completely around the longitudinal members. Around the frame was wound diagonally a first skin of 3-32 inch mahogany planking. This was covered with heavy Sea Island cotton set in marine glue, and over this was secured another skin of 3-32 inch mahogany plank, laid longitudinally. Not only did the partially completed hull look like a cigar, but it was wrapped like one. Two holes were cut in the tube to permit the entrance of the pilot and, possibly, of one passenger. The pilot's seat is low, both to give him every protection from the wind, and to bring the shoulder yokes at the greatest diameter of the hull. Unless Morris sits up very straight to have his picture taken—only half his head shows above the coaming.

The superstructure is novel. The wings are set about 40 inches above the hull, attached at the top to the welded steel structure supporting the engine bed, and braced below by struts extending to a cross beam which carries the balancing pontoons. In



general outline nothing like them, I believe, has been seen in America. Swept back at an angle of 7 degrees in an easy curve that finishes in the points forming the trailing edge ailerons they strongly suggest, at certain angles, the wings of a monster swallow. This illusion is fostered by the curve given the ribs and by the occasional uptilting of the aileron on the high side of the machine. The rib curve is original, though in some measure similar to that of the British "B-E 2."

Total spread of the wings, from tip to tip of ailerons, is 34 feet. The spread of the supporting surface is 28 feet. For 20 feet in the center the chord is 60 inches, while for four feet at each end the main surface is practically triangular.

Rudder, flippers, and rear stabilizing surfaces follow the lines of those used in standard models of the Curtiss flying boats, modified as to size to fit this smaller machine.

Morris expects to ship the machine at once to St. Petersburg, Florida, whence to get in trim for the expected series of flying-boat speed contests that seem to be on the cards for the coming season.

W. J. Minier, of Brooklyn, N. Y., is now at work on a model Curtiss flying boat. He has just finished an exhibition model of a Bleriot, 1/6 full size. It is of very excellent workmanship and is complete in every detail.

AERONAUTISM LAST YEAR.

Fifty-two balloon ascensions were made during 1913 and a total of 150 people taken up, including the pilot, distributed among 18 balloons of from 40,000 to 80,000 cubic feet capacity. The total of gas used was 3,300,000 cubic feet, costing around $3,300. Fifteen of these balloons are in the central West. What a fine big race this would make! No ascensions were made by army balloons or the army dirigible during the year.

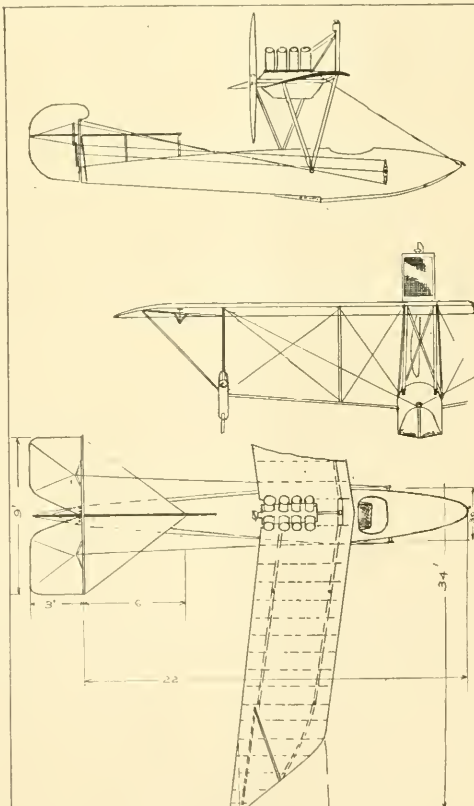
AEROPLANES FOR VENEZUELAN ARMY.

Some time ago a fund of $6,000 was raised by popular subscription to purchase one or more aeroplanes for use in the army of Venezuela. Report was made of this fact by representatives of other nations, and there has been correspondence with a London company, but nothing definite has resulted.

General Gomez, the President of Venezuela, has indicated that he would be willing to augument the amount raised by popular subscription, which may interest aeroplane manufacturers in the United States.

ARMY FLYER BREAKS RECORD.

San Diego, Cal., Jan. 20.—Lieut. W. R. Talliaferro, of the army's first aero corps, flew continuously from San Diego to Pasadena and back as far as Elsinore to-day. The distance covered—260 miles—is an American non-stop record. Lieut. Talliaferro was forced to descend because he ran out of fuel.

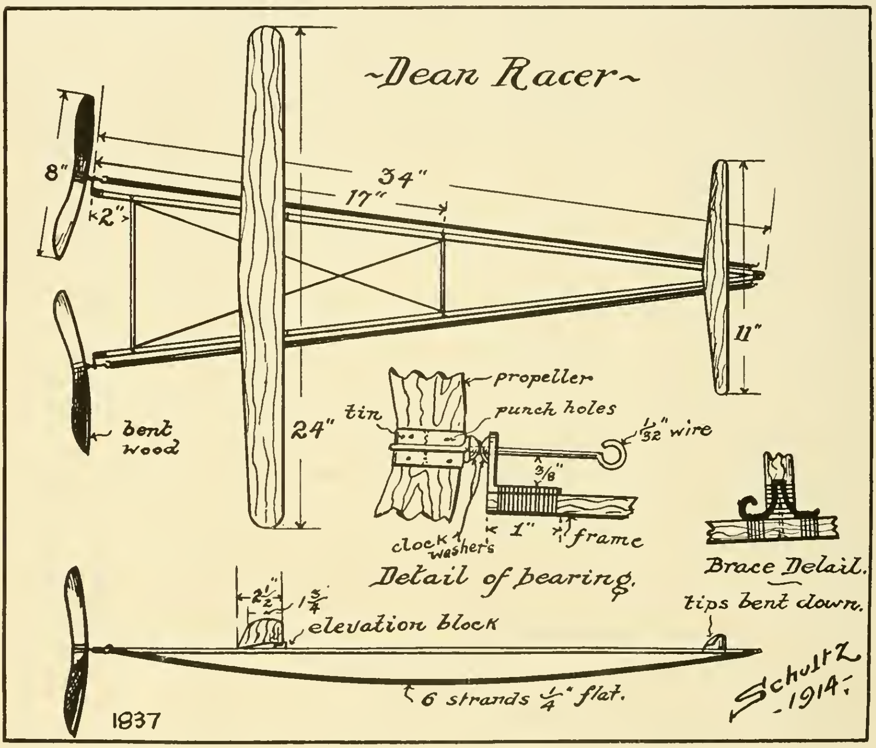


1843 CURTISS MONOPLANE

THE DEAN RACER

By HARRY SCHULTZ, Model Editor

Fuselage is constructed of two strips American whitewood ¼ inch square, 34 inches long. They are joined together at front to form a point. A "W" of 1/32 in. diameter steel piano wire is fitted thereover and bound with white silk thread and shellaced. Seventeen inches from the front, or apex, of the fuselage is a cross stay or brace of "dowel wood" planed to a stream line section ¼ in. by ⅛ in. and 3½ ins. long. The rear brace is same thickness, 6¾ ins. in length, placed 2 ins. from the rear of the fuselage. These braces are secured to fuselage by means of small nails. Fuselage is braced by diagonal braces of No. 2 guitar wire and these attach to hooks secured at the upper and lower junctions of the wooden cross braces as shown. By merely turning the hooks inwardly the diagonal wire braces are tightened.



Propellers are 8 ins. in diameter, with a blade width of 1⅜ ins. They are steam twisted, the wood being hard quality, straight grained, American whitewood 1/16 in. thick. Bent around the hub of propeller is a strip of sheet tin, secured to the blade by punch holes. Bent around this strip of tin is the shaft of 1/32 in. steel piano wire, which goes completely around the tin strip and ends in a spiral on the inner side of the propeller, where it is soldered. Mounted on the fuselage, by binding and glueing, are brackets of sheet brass, ¼ in. wide by 1/16 in. thick, drilled for the reception of propeller shaft; and fitted on said shaft are two ¼ in. clock washers of steel, acting as bearings.

Planes are of whitewood, the main plane measuring 24 ins. in span, with a chord of 2½ ins. at the center, tapering to 1¾ ins. at the tips. This plane has a camber of 1/16 in. at the center, "washed out" towards tips. It is 1/16 in. thick at center, coming to a knife edge at entering and trailing edges; entering edge being protected by a strip of silk shellaced to the edge. A slight dihedral angle is obtained by steaming and bending at the center. Elevator is made of the same material as the main plane, measuring 11 ins. long with a chord of 1 3/5 ins. at the center, tapering to 1⅛ ins. at the ends, and 1/32 in. in thickness. It has a slight dihedral angle and the tips of the same are bent downward to an angle of 30°. It is mounted on an elevation block ⅛ in. in height by ¾ in. wide. The main plane is so narrow and affords such small lift it is given an elevation on blocks 3/16 in. in height, the blocks being secured to the plane by small nails, driven and clinched over.

Each propeller is driven by six strands of ¼ in. flat rubber totaling 1½ ozs. in weight.

When tested in flight the model proved to be marvelously fast and it is unfortunate that its distance qualities have not been ascertained.

See "News in General" for model contests.

AERONAUTICS
AND FLY

Published Semi-Monthly by Aeronautics Press
122 E. 25th St., New York
Cable: AERONAUTIC, New York
'Phones { 9122 / 4413 } Madison Sq.

A. V. JONES, Pres't — ERNEST L. JONES, Treas'r-Sec'y
ERNEST L. JONES, Editor — M. B. SELLERS, Technical Editor
HARRY SCHULTZ, Model Editor

SUBSCRIPTION RATES
United States, $3.00 — Foreign, $3.50

No. 78 — JANUARY 31, 1914 — Vol. XIV, No. 2

Entered as second-class matter September 22, 1908, at the Postoffice, New York, under the Act of March 3, 1879.

¶ AERONAUTICS is issued on the 15th and 30th of each Month. All copy must be received 6 days before date of publication. If proof is to be shown, allowance must be made for mailing.

¶ Make all checks or money orders free of exchange and payable to AERONAUTICS. Do not send currency. No foreign stamps accepted.

News in General

LANGLEY AERODYNAMICAL LABORATORY.

The Advisory Committee of the Langley Aerodynamical Laboratory held its third meeting December 1 at the Smithsonian Institution. Secretary Charles D. Walcott, Chairman of the Committee, presided, with the following members in attendance: Captain W. I. Chambers, U.S.N.; Mr. John Hays Hammond, Jr.; Dr. W. J. Humphreys; Col. Samuel Reber, U.S.A.; Naval Constructor H. C. Richardson, U.S.N.; Major Edgar Russel, U.S.A.; Brig. Gen. George P. Scriven, U.S.A.; Dr. S. W. Stratton; Dr. Albert F. Zahm (Recorder).

Major Russel submitted a complete account of the aeronautical motor-testing laboratory of the U. S. Signal Corps and Bureau of Standards. [Published in the December issue.]

Dr. Zahm submitted to the Committee an extended list of the best recent works on aeronautics in English, French, and German, which will be available to all investigators in aeronautics who may choose to examine them. Dr. Zahm also gave a brief abstract of his complete and extended report on European aeronautical laboratories, their organization, resources, equipment, investigations, etc.

Captain W. I. Chambers reported that his committee on naval air craft design had made extensive experiments during the summer on gyroscopic stabilizing apparatus, the results of which were very interesting, but not quite ready yet to be given in detail. He stated that the navy desired a form of flying machine adapted for both land and water use.

Dr. Stratton spoke of the great need for a more uniform and accurate type of anneroid barometer at the present time, and told of the work of the Bureau of Standards in developing a standard type of this instrument. He also gave an account of the aeronautical laboratories of England and France, which he had studied preparatory to aerodynamical experiments for the Advisory Committee at the Bureau of Standards.

Naval Constructor Richardson reported that his committee had conducted elaborate experiments on the forms of hulls of flying boats, in relation to their speed and resistance when on the water and when submerged, as a result of which a form of hull has been devised which appears to have decided advantages over those already in use, in point of stability and economy of power.

General Scriven explained the tests by the Army of the various forms of machines, and took occasion to emphasize the high standard of efficiency now required of the army fliers. At the recently established school of aviation at San Diego, there are at present fifteen army officers receiving instruction and training, which is more thorough and exact than that given at the schools conducted by the commercial companies. He spoke with even greater emphasis of the caution drilled into the minds of the officers not to attempt mere circus feats in the air, but to confine themselves only to such experiments as would fit them for the actual needs of flying in time of war.

Mr. John Hays Hammond, Jr., announced that very satisfactory experiments have been conducted at the Hammond Radio-Research Laboratory at Gloucester, Mass., in the development of wireless receiving apparatus for use with air ships. New and much improved results have been achieved in long-distance reception, using small transmitting antenna and small receiving aerials. Mr. Hammond was invited to test the working of his apparatus on a Signal Corps aeroplane to ascertain its value for the transmission of intelligence between the commanding officer and his air scouts on the wing.

CONNECTICUT COMPANY READY FOR BUSINESS.

The Connecticut Aeroplane Company, of New Haven, Conn., recently incorporated, now has one of their representatives in Europe, perfecting arrangements, securing data, etc., for a start in February. The company proposes to "build a product equal to the world's best in model, strength of construction and finish. Looking still to the future it proposes to go further and standardize its flying machines as the automobile has been standardized, making all parts of any year's model interchangeable, and with parts easily obtainable. The aeroplanes and flying boats of The Connecticut Aeroplane Company will be built by the M. Armstrong Company of New Haven, one of the oldest firms of its kind in the United States, whose product has a national reputation for excellence. This company has today a large trade in automobile bodies, but is able to give space to the manufacture of planes as well, without interference with other work. No higher guarantee of excellence in construction of air craft is needed than the announcement that The M. Armstrong Company will build them. Freedom from heavy overhead expense will be largely eliminated, which will, of course, very considerably reduce the first cost of the planes." The Armstrong Company has gone very thoroughly into the matter of manufacture, and have guaranteed this company that they can produce and deliver two machines a week.

MODEL CLUB NOTES.

At the well-attended meetings of the Long Island Model Aero Club business has been carried on in the usual way. On Friday, November 28, medals were presented to Messrs. Freelan and Bamberger, winners in recent contests. Mr. L. Ness was awarded a medal for his standing in a recent tractor contest. An excellent contest was held on November 23 for tractor models. This contest was won by Mr. C. V. Obst, with a flight of over 600 feet, which is comparatively a simple flight for this model to make. Many new models are being brought out weekly, the most notable of which are a beautifully constructed headless type duration and altitude flyer constructed by Mr. Daniel Criscouli, and a smaller machine of similar type by Mr. Hackradt. Ness' three-bladed tractor model has been making excellent flights. Obst has been experimenting with the tail planes of his tractor model and has found methods of greatly improving the lift of same.

The club has accepted a challenge from the junior L. I. M. A. C. and the contest will be held shortly. The Bay Ridge Model Aero Club is steadily coming to the fore. At all contests held lately the members of this club were much in evidence, generally scoring a win for the club. Most notable among the members are the Bamberger brothers, who are in fact the founders and guiding spirits of the club, and it is very seldom that the names of one of the brothers does not appear as the winner of a contest. Other well-known flyers are Messrs. Heil and Olson. The club has not a very large membership, but Mr. W. F. Bamberger, the president, states they desire "quality and not quantity."

On December 20, 1913, in spite of a bitter cold, blustry day the last contest for the Herreshoff trophy was held. The first two contests for this trophy, held on previous Saturdays, had been won by Frederick Watkins, and it looked as though he would be a winner of the last and final contest, but Rudie Funk, of the Long Island Model Aero Club, with his world's record distance model proved otherwise and he quickly took the lead with a flight of 1,592 feet. Excellent flights were also made by L. Bamberger, of the Bay Ridge Model Aero Club.

AERO CLUB PENNSYLVANIA

OFFICIAL BULLETIN

A. C. PENN. ELECTION.

The annual election of officers was the principal feature of the meeting of the Aero Club of Pennsylvania, held at the Bellevue-Stratford Hotel, Philadelphia, on Friday evening, January 9th. Those chosen were:

President—Clarence P. Wynne.
Vice-President—Joseph A. Steinmetz.
Second Vice-President—W. D. Harris.
Secretary—George S. Gassner.
Treasurer—Laurence Maresch.

The Program Committee have arranged for a talk by the First Vice-President, Jos. A. Steinmetz, at the monthly meeting on Feb. 6th, at which time Mr. Steinmetz will describe the appliances for which he has been recently granted patents, providing for defense against invasion by aeroplanes and dirigibles in time of war. At the monthly meeting, on March 26th, Col. Samuel Reber, U. S. A., will address a joint meeting of the Franklin Institute and the Aero Club on "Recent Progress in Military Aeronautics."

FOUR FLY FAST FOR FLYING BOATS.

Dr. C. M. Olmsted, of the C. M. O. Physical Laboratory, of Buffalo, is now at Miami, Fla., making tests of a new propeller, worked out by the Laboratory, on the McCormick four-passenger Curtiss flying boat in charge of C. C. Witmer. In a preliminary trial on January 17 four heavy passengers were carried at an increased rate of speed over that attained theretofore with aviator alone; also got off the water with four up with the wind and flew with the motor at quarter throttle. This was the first flying test for this new propeller, which has been patented.

SLOANE TO PRODUCE FLYING-BOATS.

Miller Reese Hutchison, E.E., Chief Engineer to Thomas A. Edison, was recently elected Vice-President of the Sloane Aeroplane Company of New York. This is the first instance of any noted engineer engaging in the manufacture of aeroplanes in this country and, no doubt, Mr. Hutchison's engineering ability will be of much advantage to the company, which has now enlarged its manufacturing activities and is preparing to construct flying boats and biplanes as well as monoplanes.

Mr. Sloane and Walter H. Phipps are working on the design of an original monoplane which, it is confidently expected, will be one of the most efficient aeroplanes in the world.

The Sloane land school, which will open at Hempstead in April with John Guy Gilpatric in charge, promises to be even more successful than in previous years and already a number of pupils have enrolled. The Sloane Aeroplane Company will also open a flying boat school in the vicinity of New York and this will undoubtedly attract a number of pupils as well as arouse considerable interest in flying boats among New Yorkers.

LIEUT. POST MAKES 152 MILES CROSS COUNTRY.

San Diego, Jan. 9.—Lieut. H. B. Post, in a Wright biplane with 40-h.p. Sturtevant motor, flew non-stop to Winchester, via Oceanside, a distance of about 76 miles.

About 10 miles inland, the country is very mountainous for 10 miles more, with very bad air conditions at the time. The air was so rough that the effort of staying in the seat became even more wearing than controlling the machine. The machine itself acted almost like a bucking horse, tipping up, down and sideways with entire impartiality, and occasionally spinning around sideways from 45 to 90 degrees. Many times the maximum wind warp was entirely without effect until he allowed the machine to plunge downward a considerable distance and thus pick up high speed. The altitude at the beginning of this 10-mile stretch was 5,000 feet, probably 1,500 feet above the peaks, but he lost about 1,000 feet due to the necessity of plunging to regain control.

The supply of gasoline gave out at 11.05 a. m., over Winchester, Cal., 19 miles from Beaumont, the objective, and it was decided to leave the machine at Winchester over night.

The return trip was made without incident the following day, except that in the morning Post found a portion of the tail of the machine to which one of the elevator controls is attached broken, also the throttle wire.

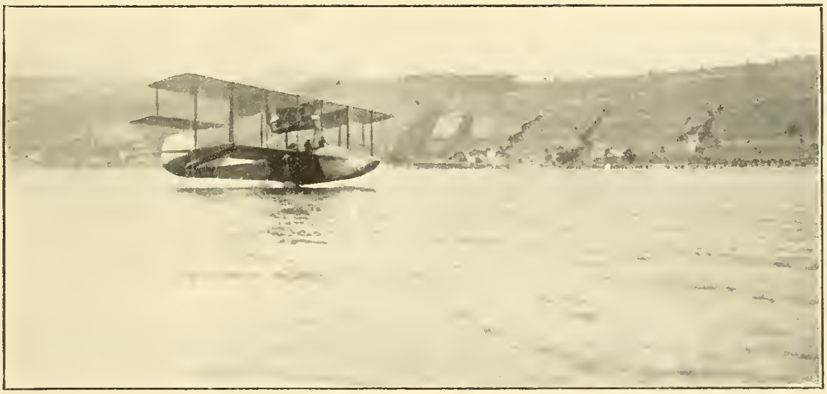
AERO MART

Vol. XIV. No. 3 FEBRUARY 14, 1914 15 Cents

AERONAUTICS

Combined with FLY

FEBRUARY MID-MONTH EDITION



Standard Curtiss Flying Boat, 4 Passengers

PROPELLER EXPERIMENTS—By M. B. Sellers

Series 1—Oct. 28 to Nov. 6, 1913.

APPARATUS DESCRIBED, CONSTANTIN PROFILE TESTED.

The object of the present investigation is to determine the thrust and speed of various propellers under the same torque, and in this series the Constantine profile is compared with some other types.

If we compare a propeller blade to an aeroplane wing, the thrust will correspond to the lift, and the turning moment to the drift. The propeller, acting on air, in motion axially, might roughly be compared to an aeroplane climbing.

Of two propellers, identical except in blade profile, the torque being the same, that giving the greater thrust will have the more efficient profile (i. e., the higher lift ratio). This, however, involves a consideration of the angle of attack; one profile may be the more efficient at one angle and the other at another angle.

The angle of attack of an element of a propeller blade rotating at a fixed point will depend on its inclination, velocity and on the velocity and direction of the part of the slip stream which it encounters. It would seem that this angle does not differ greatly for fixed point rotation from that in flight; however, I shall consider this matter at another time.

As this inquiry concerns the direct connected propeller with small angle of attack, the pitch of the test propellers was purposely made short.

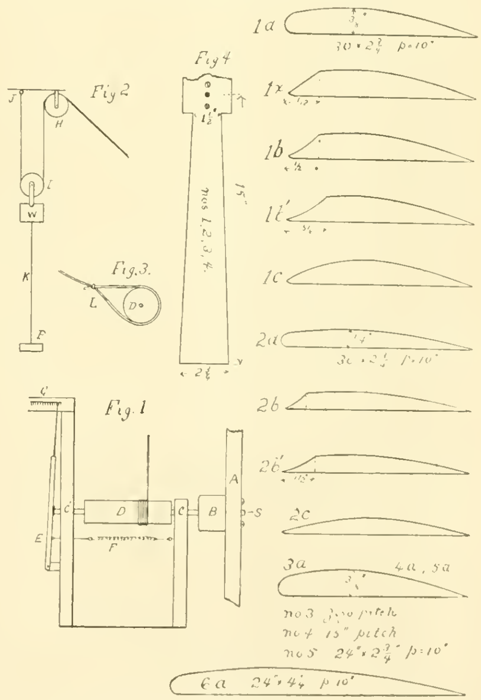
Apparatus—The function of the present apparatus is to rotate all propellers with the same torque, to measure the thrust, and to enable the speed to be determined. For this I employ a descending weight, rotating the propeller by means of a cord wound around a drum. This device, though primitive, possesses some advantages over more elaborate apparatus.

In Fig. 1 the drum D is affixed to the shaft S turning in bearings CC′. The propeller A is fastened to the boss B by two screws. The shaft has a play axially of ⅝ in., and the thrust of the propeller extends the spring F, moving the pointer E over the scale G. In Fig. 2 the cord which leads from the drum D over the pulleys H and I to the fastening J, is shown. [1] With the present arrangement, the drum makes 60 revolutions during the descent of the weight W, and it was found that the acceleration continued throughout this run. To obviate this, the weight P was suspended from W by the cord K. By adjusting the length of K and weight of P, the proper acceleration was produced by P and W acting together, and after P had struck the floor the speed was maintained constant by W acting alone. To keep the cord from escaping, the loop L, Fig. 3, was made in its end. The rotation at constant speed varied from 35 to 40 revolutions with different propellers, during which time the pointer remained stationary. The time was taken from the moment when P struck the floor till W struck P; the possible error was one-fifth second, giving speed error between 5 and 10 per cent. It was not intended to determine speed accurately.

To insure an open scale several springs were used, one from 0 to 10, one from 8 to 18, etc. The calibration was tested every few runs. The aggregate thrust error did not exceed ½ oz. The drum measures 1¼ in. x 6 in.; the actual measured torque (at 1 ft. .) was 3.8 oz. All propeller blades were segmental as shown in Fig. 4. The pitch of all, except Nos. 3 and 4, is 10 in., practically uniform (except near hub). Propellers 1b and 1c are modifications of 1a. Type b has the Constantin wind deflecting curve at the entering edge. No. 1 and No. 2 are the same except in thickness. The table gives the thrust in ounces and revolutions per minute.

It is seen that the Constantin profiles are inferior to types *a* and *c*; this was a surprise to me because, although it confirmed my original opinion, it was contrary to the reported results obtained with this profile.

In the second experiment with No. 1b′, where the weight W has been increased to give a torque of 5.6 oz., the velocity has risen to 800 rev.; but the thrust is still less than that for 1a or 1c. The conclusion is obvious.



The *c* type is more efficient than the a type, at least for small angles of attack.

No. 1d, cambered on face 1-16 in., gave slightly less thrust than with flat face.

The superiority of No. 2 over No. 1 shows the advantage of a thin blade.

Continued on page 42

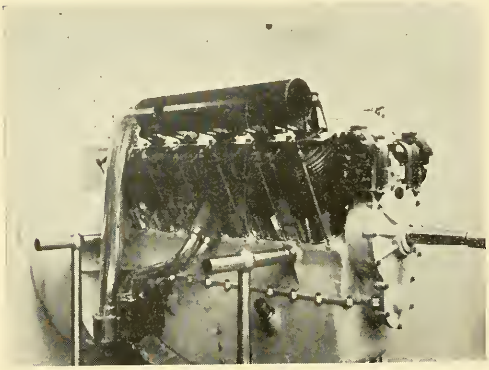
FOREIGN AERONAUTICAL MOTORS

By the Staff Correspondent.

The variety of different types of motors exhibited at the recent Paris Aeronautical Salon would indicate that European designers and manufacturers are still at a difference of opinion as to which is the best type of motor for the purpose. It is not the purpose of this article, however, to discuss suitability or prophesy the ultimate type. We will confine ourselves to the salient points of each motor, commencing with those of the stationary type.

The Renault is probably the best known of the foreign motors in the United States because of the fact that our Government has purchased ten or more of these during the past year, and the American cross-country record was accomplished by Lieut. Milling with a Burgess tractor biplane fitted with a 70-h.p. Renault. This engine is built in one of 70 and 100-h.p. sizes. The smaller motor has eight individual, air-cooled cylinders arranged on one crank case in groups of 4 at 90 degrees to each other and acting upon a single crank shaft. A single cam shaft also operates all the valves, the inlet valves being in pockets on the sides of the cylinders and the exhaust valves in the heads.

The cylinders have a bore of 3¾ in. and a stroke of 4¾ in., and the motor develops its rated horsepower at 1,800 r.p.m. As this speed is not suitable for direct operation, the propeller shaft is formed by an extension of the cam shaft, which, of course, rotates at one-half the speed of the crank shaft, or 900 r.p.m. This feature has undoubtedly contributed largely to the success of the engine because of



the fact that the slow speed propeller, for slow speed machines, is much more efficient. It is also claimed by the manufacturers that any gyroscopic effect of the propeller is overcome by the crank shaft rotating in the opposite direction.

Cylinders are cooled by a fan on the crank shaft which delivers a large volume of air into a chamber between the two groups of cylinders formed by a sheet metal housing over the top of the engine, and the air passes out through the horizontal flanges on the cylinders, thereby giving very uniform cooling to each one. This fan, however, absorbs a considerable amount of power, probably not less than 6 h.p. when the engine is operating at full speed, and it is a question whether this arrangement is lighter per horsepower delivered to the propeller shaft than the water-cooled design when one subtracts the power required to operate the fan, and adds the weight of the fan and its sheet metal housing and the rather heavy cooling flanges which are necessary on the eight cylinders. The convenience of the air cooling, however, is a great advantage.

The carburetor is of the manufacturer's own make of the duplex type, having a single float chamber and two separate jet chambers, with an inlet pipe leading to each group of four cylinders. The engine is fitted with a single spark, Bosch magneto of the H.L. type, operating at engine speed and firing all eight cylinders.

Lubrication is accomplished by a gear pump located in the oil sump in the bottom of the crank case. This pump delivers the oil under a slight pressure to the main bearings, from where it is thrown off into circular oil scoops on the crank shaft, lubricating the connecting rods by centrifugal force. All other parts of the motor are oiled by splash. Baffle plates are interposed between the base of the cylinders and the crank case to prevent over-lubrication of the cylinders.

The two groups of cylinders do not stand directly opposite each other on the crank case, but are staggered the necessary amount, so that all the connecting rods are alike, and each has separate big end bearings. The weight of this motor, complete with magneto and carburetor, is 415 lbs.

The 100-h.p. Renault is of the same general appearance as the 70-h.p. size, except that it has 12 cylinders, 3¾-in. bore by 5½-in. stroke, and these are arranged in two groups of six at an angle of 60 degrees to each other. This difference between the angle of the cylinders of the 8-cylinder and 12-cylinder motors is, of course, necessary in order to secure uniform firing.

In the case of this larger motor, the cylinders are placed opposite each other, and the two connecting rods act upon a common crank shaft bearing, one being a master rod and the other being attached to it with a small pin like the piston pin arrangement. Two single spark Bosch magnetos are used, each firing one set of six cylinders. A double carburetor, as on the 8-cylinder motor, also divides the motor into two separate 6-cylinder engines.

This engine is very long and somewhat clumsy for its power, weighing 630 lbs. However, it develops its rated horsepower quite easily, as was shown when one was recently tested by the U. S. Government at Annapolis, and developed 103 h.p. on the propeller shaft at 900 r.p.m., and, of course, was developing somewhat more than this on the crank shaft because of the loss in the reduction gears.

To be continued

THE SPERRY GYROSCOPIC STABILIZER

One January 21st, Lawrence B. Sperry left for France with the latest development of the gyroscopic stabilizer, with which experiments have been conducted at the Curtiss plant, at Hammondsport, for the past eighteen months.

The device may be placed in any convenient location on a gasless craft and connected by cables with ailerons or warping wings and with the elevator. The sole ambition in life of the controlling gyroscopes used is to maintain their position parallel with the horizon. A tilting up on one wing end opens a small valve in an air cylinder and permits air from a storage tank to move a piston. The piston rod is connected to a vertical lever, to which cables run to the ailerons. It is clear that this can be arranged to pull upward the aileron on the high side and create a downward pressure, and the reverse for the low side.

The same gyroscopes resent longitudinal tipping, and another cylinder and piston are employed for operating the elevator.

To bank on a turn, the operator in the Curtiss machine, for instance, moves his shoulder brace as ordinarily. This, of course, opens the valve in the cylinder again and the ailerons operate to bank. At the point desired, the automatic device, the gyroscope, takes up the work again and maintains the set bank, until the operator puts the machine back on a level keel again. As a matter of fact, the pilot "fools" the gyroscope by changing its horizontal relation to the horizon, and it goes right on believing that any further alteration in bank beyond the amount set for is abnormal and should be automatically corrected. A similar stunt is done to volplane.

The illustration (Fig. 1) shows the earlier device located under the seats of the Navy's "C-2." The device in the foreground is the one for lateral stability. A separate unit was used for longitudinal stability, located in the bow of the boat. A is the arm opening the valve. A cable is run to a foot lever; pulling on this opens the valve to the outside air and cuts out the automatic device. C is the lever which is hooked by a rod to the usual Curtiss shoulder yoke control. E is the piston rod which operates the lever C, as is obvious.

Fig. 1 also shows a diagrammatic view of the wiring of the aileron control system. H is a little lever which opens the shoulder braces to permit easy ingress. At J is the device equalizing the pressure on the ailerons. Many changes have been made in the device now taken to Europe, as will be noticed later on.

Electric current to rotate the gyroscopes, which are practically induction motors, at a speed of 14,000 r.p.m. is obtained from a generator, which is now driven by a belt from the aeroplane's engine. Increase of engine speed shifts the belt, so that a fairly uniform generator speed is obtained. This generator furnishes both direct and alternating current, which may be used for lighting, ignition, wireless or other purposes. This generator weighs about 22 lbs. The gyroscopes, their frames, cylinders and other mechanisms, weigh about 40 lbs. A compressed air tank adds some 12 lbs. Uniform pressure is maintained in the tank by an automatic pump fitted in a hole drilled in the top of the cylinder, and forces air and gases from the engine cylinder into the reservoir on the firing stroke. Later on electricity will be used instead of the compressed air tank.

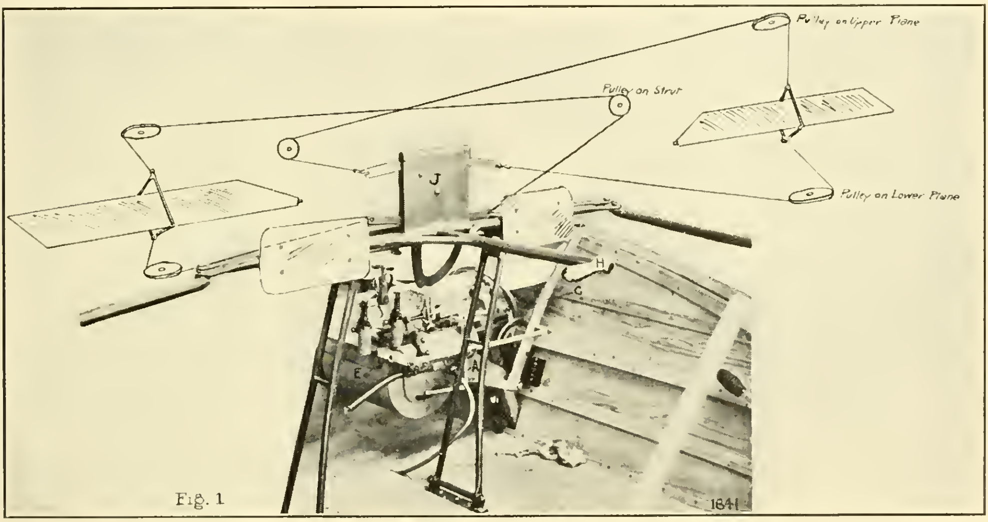


Fig. 1

Continued on page 39

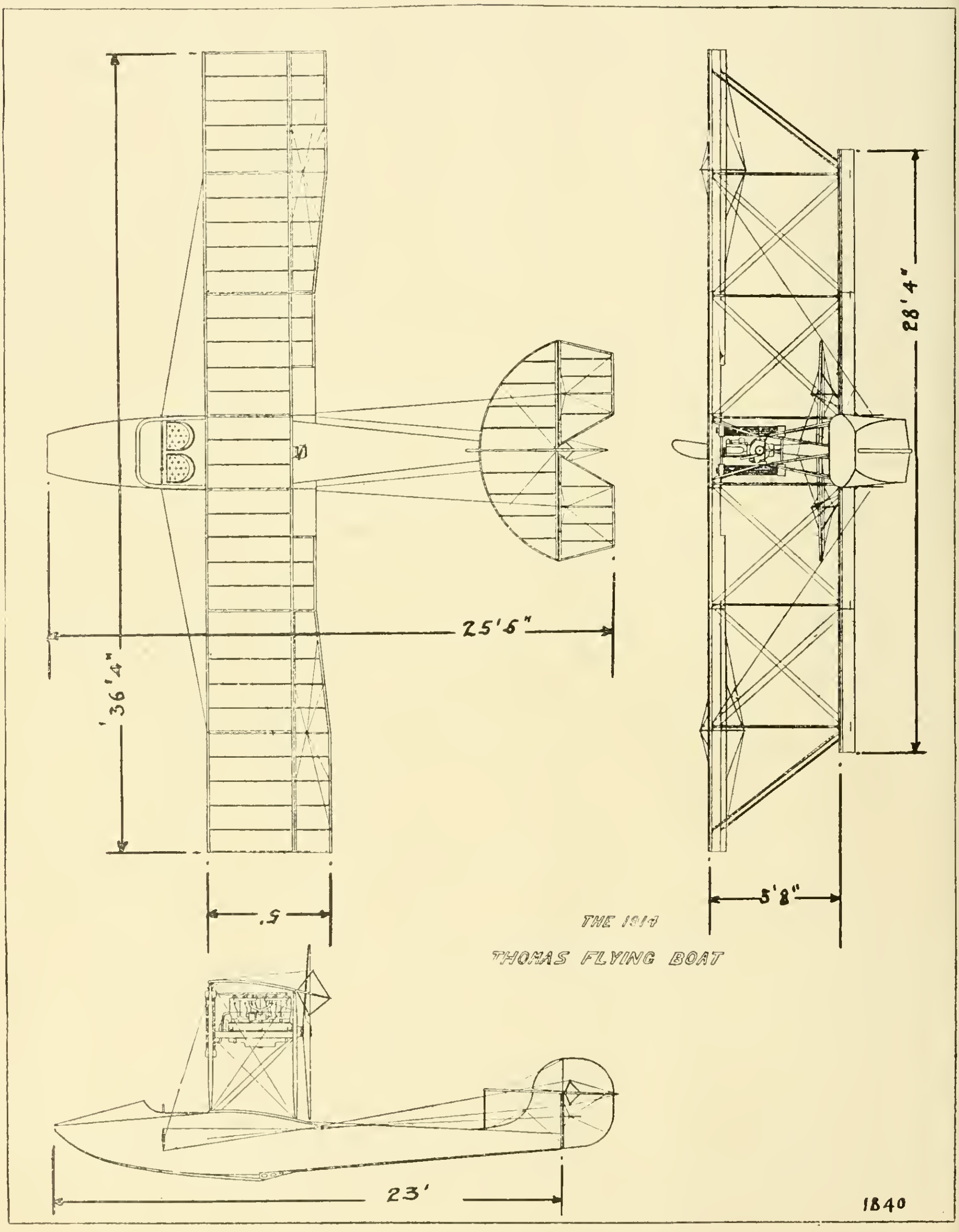
THE THOMAS FLYING BOAT

The 1914 Thomas flying boat has many new features, both in design and construction, and is in keeping with the Thomas reputation of high-grade design and efficiency. During the past year several methods of construction were experimented with.

First, the all-wood hull was tried and discarded because of the great amount of water absorbed by the planking. It was found that the all-wood hull would increase in weight over 100 lbs. after being in use a couple of weeks.

Next, a wooden hull was tried with metal bottom. This was found to have advantages over the all-wood hull, but still the sides absorbed a great deal of water.

Finally, a third type was tried, in which the hull was built of wood and then entirely covered with metal. This boat was



put through a number of tests during the summer and fall, and in efficiency, both in the water and air, more than filled its designer's expectations. It has been timed to leave the water in eight seconds from the time the engine was started, and to have a speed of over 65 miles an hour in the air.

The 1914 model contains all the good features of last year's model, and in addition has new ones in both design and construction. The new model might well be called "The boat with a backbone," as, contrary to the usual practice in flying-boat construction of building over frames and fitting in braces and centerboard last, the new model is built from the keel up, just as all boats are built, from the smallest motor boat to an ocean liner.

Length over all, 25 ft. 5 in.; length of hull, 23 ft; span of top plane, 36 ft. 4 in.; span of lower plane, 28 ft. 4 in.; chord, 5 ft.; gap, 68 in.; top beam, 40 in.; bottom beam, 34½ in.; maximum depth, 36 in.; total area of main planes, 310 sq. ft.; power plant, Austro-Daimler 90 h. p.; total weight of flying boat, empty, 1,275 lbs. Hull proper is 23 ft. in length, beam 34½ in. at bottom and 40 in. at top. Divided into water-tight compartments, any one of sufficient capacity to float the machine. Spruce keel entire length of boat; from this the body of the hull is built up on ribs of spruce spaced 4 in. apart and double planked with cedar. Two layers of ¼-in. planking. Decided V bottom, from the step to a point forward of the seats, which makes a stronger construction than flat bottom and does not add to weight. After planking, the boat is entirely covered with a special grade of galvanized sheet steel. It will not absorb water, is easy to repair in case of puncture, and will last indefinitely. Mahogany spray shields; cockpit paneled with same material. Seats upholstered in dark gray. Center panel of spray shield operated by small lever in cockpit, making an easy entrance to the boat.

Bottom of boat is protected by a large center skid of ash, running entire length, and two smaller ones on the sides. Center skid is fastened to inside keel by an improved method, which prevents leakage. Skid is shod with steel, and at the step has a heavy heel which is capable of supporting the entire weight of the machine. The boat is finished in battleship-gray color, and all metal work is highly polished.

The hull has been designed for use with the engine mounted either midway between the planes or on the hull itself. With the motors mounted between the planes, the boat has extra seating capacity in the after cockpit.

Wings are built up in panels, for convenience in shipping; upper plane containing seven sections, and lower five. All guy wires 3/32 in. galvanized steel cable, fitted with a special type of Bleriot turnbuckle. All control wires are doubled for safety. The standard Thomas strut socket is used, and struts can be taken out and planes packed without losing any wires. Wing curve is standard Thomas curve, used for past four years. The stabilizer is 10 ft. in length and an average of 2 ft., with an area of 20 sq. ft. The two elevator flaps contain 22½ sq. ft., and the balanced rudder 9 sq. ft. The ailerons have a length of 11 ft. and an average width of 18 in., and contain about 33 sq. ft.

The boat is fitted with a new system of control. The elevator is worked in the usual way, by forward and backward movement of the steering column, and the rudder by rotating wheel on it, but the aileron control is worked by foot pedals. The whole control is very neatly worked out and undoubtedly will be adopted as standard, with a view to meeting the United States Navy requirements.

THE SPERRY GYROSCOPIC STABILIZER

Continued from page 37

A dial on one side of the device shows the angle of flight at all times. A plate anemometer, which may be located in any convenient place, shows on a dial, similar to an automobile speedometer, the speed of the aeroplane relative to the air. Adjustment can be made so that a fall in speed to any set point will operate the air valve in the cylinder and cause the machine to 'plane until the proper speed has again been attained.

The bow of the boat shown in Fig. 1 contains, in the experimental device, a duplicate of the set shown, connected to the elevator control system and operating in the same manner as the other unit. Added to this was the plate anemometer.

In the latest machine, the gyroscopes for both stability systems and all mechanisms are located in one unit.

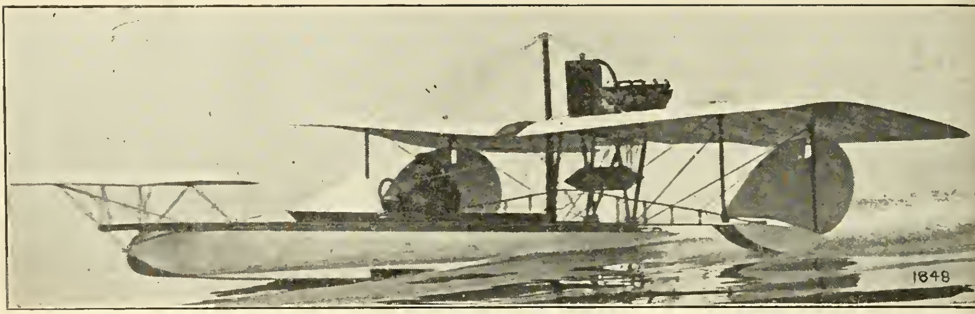
Table For Calculating Weights of Aeroplane Frame-Work

Width	Thickness ¼"	⅜"	½"	⅝"	¾"	⅞"	1"	1⅛"	1¼"	1⅜"	1½"	1⅝"	1¾"	1⅞"	2"
¼"	.00094	.00141	.00188	.00234	.00281	.00328	.00375	.00422	.00469	.00516	.00563	.00609	.00656	.00703	.00750
⅜"	.00141	.00211	.00281	.00352	.00422	.00492	.00563	.00633	.00703	.00733	.00844	.00914	.00984	.0105	.0113
½"	.00188	.00281	.00375	.00469	.00563	.00656	.00750	.00844	.00938	.0103	.0113	.0122	.0131	.0141	.0150
⅝"	.00234	.00352	.00469	.00586	.00703	.00820	.00938	.0105	.0117	.0129	.0141	.0152	.0164	.0176	.0188
¾"	.00281	.00422	.00563	.00703	.00844	.00984	.0113	.0127	.0141	.0155	.0169	.0183	.0197	.0211	.0225
⅞"	.00328	.00492	.00656	.00820	.00984	.0115	.0131	.0148	.0164	.0180	.0197	.0213	.0230	.0246	.0263
1"	.00375	.00563	.00750	.00938	.0113	.0131	.0150	.0169	.0188	.0206	.0225	.0244	.0263	.0281	.0300
1⅛"	.00422	.00633	.00844	.0105	.0127	.0148	.0169	.0190	.0211	.0232	.0253	.0274	.0295	.0316	.0338
1¼"	.00469	.00703	.00938	.0117	.0141	.0164	.0188	.0211	.0234	.0258	.0281	.0305	.0328	.0352	.0375
1⅜"	.00516	.00733	.0103	.0129	.0155	.0180	.0206	.0232	.0258	.0284	.0309	.0335	.0361	.0387	.0413
1½"	.00563	.00844	.0113	.0141	.0169	.0197	.0225	.0253	.0281	.0309	.0338	.0366	.0394	.0422	.0450
1⅝"	.00609	.00914	.0122	.0152	.0183	.0213	.0244	.0274	.0305	.0335	.0366	.0396	.0427	.0457	.0488
1¾"	.00656	.00984	.0131	.0164	.0197	.0230	.0263	.0295	.0328	.0361	.0394	.0427	.0459	.0492	.0525
1⅞"	.00703	.0105	.0141	.0176	.0211	.0246	.0281	.0316	.0352	.0387	.0422	.0457	.0492	.0527	.0563
2"	.00750	.0113	.0150	.0188	.0225	.0263	.0300	.0338	.0375	.0413	.0450	.0488	.0525	.0563	.0600
2¼"	.00844	.0127	.0169	.0211	.0253	.0295	.0938	.0380	.0422	.0464	.0506	.0548	.0591	.0633	.0675
2½"	.00938	.0141	.0188	.0234	.0281	.0328	.0375	.0422	.0469	.0516	.0563	.0609	.0656	.0703	.0750
2¾"	.0103	.0155	.0206	.0258	.0309	.0361	.0413	.0464	.0516	.0567	.0619	.0670	.0722	.0775	.0825
3"	.0113	.0169	.0225	.0281	.0338	.0394	.0450	.0506	.0563	.0619	.0675	.0731	.0788	.0844	.0900
3¼"	.0122	.0183	.0244	.0305	.0366	.0427	.0488	.0548	.0609	.0670	.0731	.0792	.0853	.0914	.0975
3½"	.0131	.0197	.0263	.0328	.0394	.0459	.0525	.0591	.0656	.0722	.0788	.0853	.0919	.0984	.105
3¾"	.0141	.0211	.0281	.0352	.0422	.0492	.0563	.0633	.0703	.0733	.0844	.0914	.0984	.105	.113
4"	.0150	.0225	.0300	.0375	.0450	.0525	.0600	.0675	.0750	.0825	.0900	.0975	.0105	.113	.120

Calculated By H. L. Prout

This Table Gives The Weight, Per Inch of Length, of Different Sizes of Spruce
For Ash Multiply By 1.467
For Round or Elliptical Shapes Multiply By .7854
This Table is Computed on The Basis of Spruce = .015# Per Cubic Inch and Ash = .022# Per Cubic Inch.

1044



THE BOLAND FLYING BOAT

The Boland flying boat made its debut at the Motor Boat Show in February. Here is surely an original affair—a tailless, rudderless, aileronless monoplane flying boat, and alleged to be non-infringing!

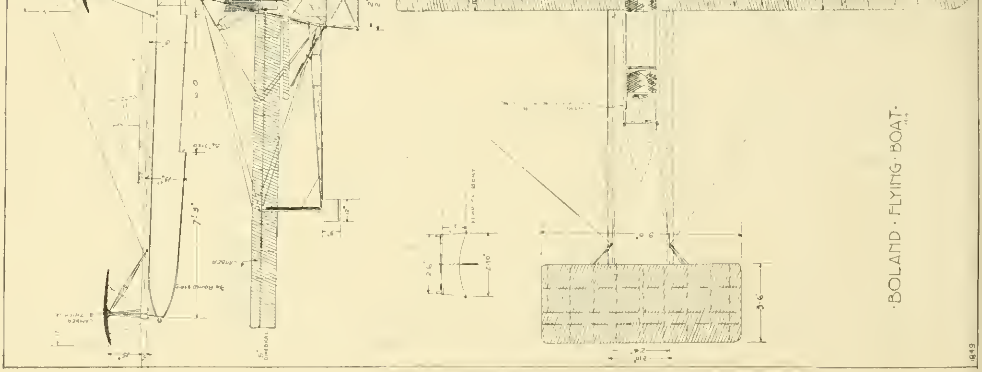
Frank E. Boland began experimenting, as we recall, in 1907, and bought an almost unflyable machine in 1908 and started to work. Eventually he brought to the public notice his "jib" system of control, with which readers are entirely familiar through drawings and descriptions of earlier machines. To steer the machine, the hand-wheel is turned left or right for steering thus respectively. The cable pulls one jib only inward, creating a resistance on that side of the machine tending to turn and bank it. The jib is revoluble about an oblique axis from the lower end of the forward strut to the upper end of the rear strut. To balance, the jib on the high side is pulled in, the hand-wheel being turned naturally to the high side. The jib produces a drag and a down pressure and the aeroplane rights. To operate the elevator, the wheel and steering column is pushed forward for "going down" and pulled toward the operator for "going up."

The wings, rigid, are guyed to a mast in the stern of the boat. A light cantilever bridge extends from the boat out to the wing-end floats and acts as a truss for the jibs and the floats.

The two-step boat is of mahogany ribs and stays, covered with one ply spruce and a layer of Irish linen painted with Conover "dope" and enamel varnish. A 3-in. ash gunwale extends along the deck and projects forward to form the support for the elevator. The engine struts are also fastened to this gunwale. The cockpit carries two tandem; 6-in. gunwale. The passenger sits under the horizontal center of gravity. At every step is a handhole for bailing out. On the dashboard there is a hand pressure pump for gasoline supply, a tachometer and an air gauge. A magneto cut-out button is located in the hand-wheel, and there is also a switch in the hub of the wheel. The right foot operates the throttle and spark, the spark advance being connected with the throttle.

The hollow mast is of oak and mahogany, laminated. This is fastened in the keel and

Continued on page 42



ANOTHER NEW CURTISS FLYING BOAT

A change in hull design, in engine section ubing and wing-end floats are the principal features of the latest Curtiss flying boat, exhibited at the Motor Boat Show in New York n February.

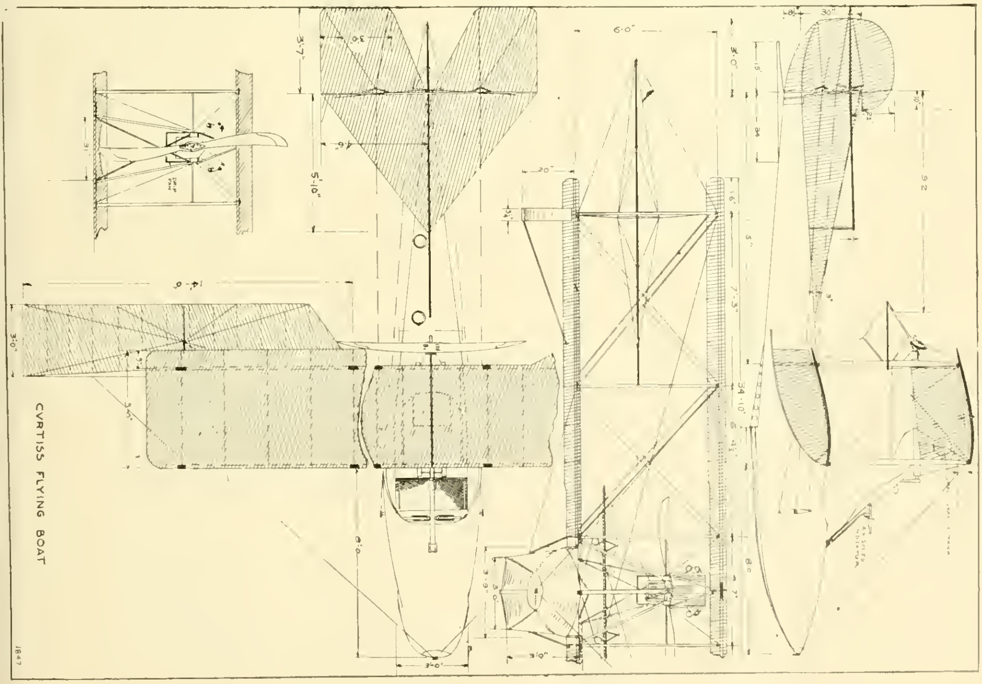
There is no folding hood, as the mahogany heathing is brought up in a solid rounded orm. At the forward seat the sides flare out lightly to make more room. The shoulder braces which operate the ailerons fold outward on either side, making for easy entrance and egress. An Elliott instrument board under the hood contains a clock, indicating barometer, achometer and air speed indicator. A knife switch for the magneto is fastened to the unler side of the hood. As the main 30-gallon gas tank is under the rear passenger seat, air pressure is employed, and there is an air gauge itted under the hood. A pop-off valve limits he amount of pressure. The air pump is geared to the cam shaft. This forces gasoline nto the small 3-gallon gravity tank just back of the radiator, which is now slightly enlarged, and has thin vertical tubes. In conjunction with the instrument board there is also an angle of flight indicator.

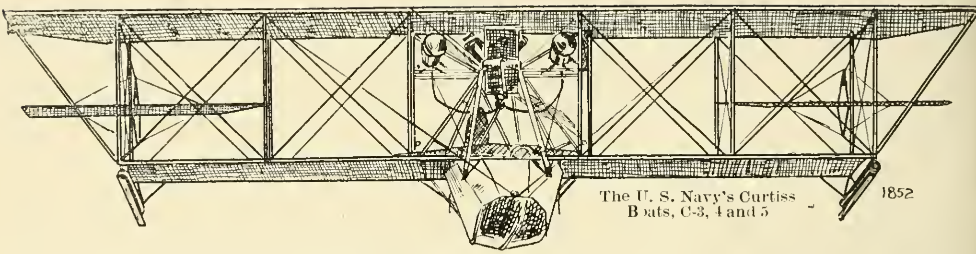
Curtiss boats are now made with one-piece wings, which allows more strength and better alignment. The lower plane in the engine section is of mahogany, cut out to allow another seat for the third and fourth passengers. The upper wings separate in the center of the engine section. The lower wings are each shorter than the two upper halves on account of allowance for the above arrangement in the lower engine section. Both upper and lower wings are connected to the engine section by Q. D. sockets. A removable pin permits rapid demounting. All struts may be removed with the wings without loosening up any of the guy wires. The power plant remains intact with the boat.

Under the wing ends are floats, fitted to the curve of the wings, straight sided, terminating in a sharp vertical edge at the rear under the beam. A flat paddle is attached on the under side. Non-skid panels are fitted as usual. The engine is an O-X 90-100, which insures an average of around 60 m.p.h. The total weight of the machine, without operator or supplies, is 1,400 lbs.

The surfaces are covered with linen, coated with spar varnish, with a high gloss. There is a starting crank, of course. This conflicts with the single large beam running down from the engine bed to the bow, but as the engine does not have to be "swung," there is no objection on this account.

The forward part of the hull has a V bottom, the greatest curvature being forward, decreasing to straight lines at the step. A towing ring is in the extreme nose of the boat, and the bow is protected with copper sheathing. The usual hand holes are to be found in the top of the tail of the boat. The wings have been flattened somewhat and the angle of flight is about 6 degrees. The fixed tail surface has a slight lifting angle. The propeller is a standard Curtiss, metal tipped, 8 ft. diameter by 5½ ft. pitch. The steering column provides two wheels for either of two men to use. Under the engine is a drip pan, which protects the occupants of the rear seat. The chord has been shortened to 5 ft.





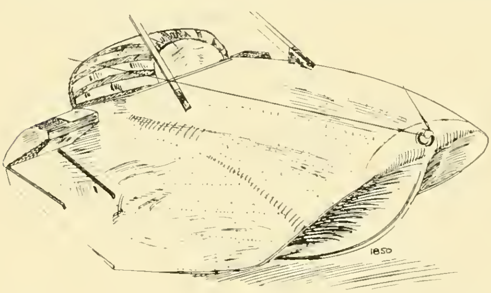
The U. S. Navy's Curtiss Boats, C-3, 4 and 5

THE U. S. NAVY'S LATEST FLYING BOATS.

The last three machines supplied the U. S. Navy are similar to the Curtiss boat seen at the Boat Show and the previous boats supplied in a general way. There is no seat under the engine for extra passengers and no drip pan under the engine. The chord is 5 ft. 6 in. The gasoline tanks flank the engine, as shown in the drawing, and the upper plane is fitted with extensions. The hood is rigid, but is differently shaped, as will be noticed in the sketch. The engine tube bracing at the rear beam is not as simple as the Show boat.

CURTISS FLYING BOAT FOR ITALIAN NAVY

Another new hull design has been employed in making the machine for the Italian Navy. The hull is straight sided instead of flaring at the forward seat, as is the custom in the standard and the U. S. Navy boats, where the occupants sit side by side. But two occupants are provided for in the Italian boat, placed tandem, permitting a narrower hull. The vertical sides are of mahogany veneer, 3-ply. This enables the entire side to be made of one



piece, i. e., the mahogany is cut out the full shape instead of being used in narrow strips. Otherwise, the internal construction is the same as that of other Curtiss boats.

The occupants, seated tandem, are entirely protected except for the face when the hood is down; when the hood is raised, they are completely covered up. This hood is constructed similar to an automobile top, with bows and fabric; transparent material is inserted in the cloth between the bows and across the front. The bows run fore and aft, and the top opens in the longitudinal center and folds down within the sides of the hull.

The hull being narrower than standard, allows of a transparent strip on either side of the hull in the lower engine section, so that the rear occupant has sight directly downward. The cockpit, in which both sit, is elliptical in shape. The front wing beam crosses the cockpit just ahead of the rear man. Controls are standard Curtiss, except that they are so arranged either man may do the operating, or can be disconnected at once for instruction work. In this boat there are two spars running down from the engine bed to the bow of the boat. In other respects the machine is the same as that seen at the Boat Show.

The weight, empty and without supplies, is 1,400 lbs. The chord of the wings in this boat is 5 ft. 6 in.; the spread is the same as the Show boat.

PROPELLER EXPERIMENTS

Continued from page 35

With zero pitch, type b gave practically no thrust, while type *c* gave 9 oz.

The No. 4, same as No. 1 except that it has 15-in. pitch, gave less thrust than No. 1.

No. 5, with 24-in. diameter, gave more thrust than No. 1; and No. 6, with blade $4\frac{1}{4}$-in. wide, gave same thrust as No. 5 at slightly reduced speed.

TABLE 1.

Propeller	Thrust, ounces	Speed. rev. p.m.	Propeller	Thrust, ounces	Speed. rev. p.m.
1a	$20\frac{1}{2}$	750	2c	26	800
1x	13	670	3c	9	920
1b	$11\frac{1}{2}$	630	4a	18	640
1b′	11	600	5a	26	1,100
1c	23	800	5b	16	960
1d	$22\frac{1}{2}$	800	5c	27	1,200
2a	$23\frac{1}{2}$	800	6a	26	1,050
2b	18	800	$1b'_2$	17	800
2b′	18	800			

(To be continued)

THE BOLAND FLYING BOAT.

Continued from page 40

guys run to the wings, the bow of the boat and the engine bed. The main wing spars end in a special socket on the mast. The wings have a camber of $4\frac{1}{2}$ in, tapering to $3\frac{3}{4}$ in. and are set at a 5-in. angle. The wings are also set at a dihedral angle in the later direction. Wings are of linen, Conover treated and spar varnished.

The 70-h.p. Boland engine will be supplanted by the new 100-h.p. motor, $4\frac{1}{2}$ x $5\frac{1}{2}$, driving a 4-bladed propeller $5\frac{1}{2}$-ft. pitch by 7-ft. diameter; 100 h.p. is claimed at 1,250 r.p.m. With the present engine the outfit weighs around 900 lbs.

Leonard W. Bonney, a former Wright flyer, is chief pilot with the Boland Aeroplane & Motor Co. A description of the 100-h.p. Boland engine will be given in a subsequent issue.

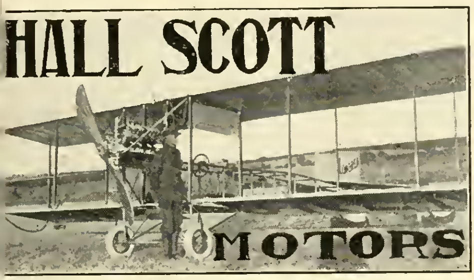
FOR FLYING BOATS USE

JEFFERY'S MARINE GLUE

Use our Waterproof Liquid Glue, or No. 7 Black, White, or Yellow Soft Quality Glue for waterproofing the canvas covering of flying boats. It not only waterproofs and preserves the canvas but attaches it to the wood, and with a coat of paint once a year will last as long as the boat.

For use in combination with calico or canvas between veneer in diagonal planking, and for waterproofing muslin for wing surfaces. *Send for samples, circulars, directions for use, etc.*

L. W. FERDINAND & CO. 201 South Street, Boston, Mass., U. S. A.



Longren and his HALL-SCOTT powered tractor

The Young Aviation Co., Topeka, Kansas have written

"We have used No. 51 three seasons, has done elegant work all this time, no motor failure, and have filled more dates than any other aviator in the state of Kansas and most of Oklahoma and Nebraska.

Signed A. R. LONGREN."

Investigate our 100 H. P. equipment

Hall-Scott Motors Guarantee Success

Hall-Scott Motor Car Co.
818 Crocker Bldg. San Francisco, Cal.

The Sloane Aeroplane Co.

The only builders in the world of military monoplanes, biplanes and flying boats. Full equipment for military and naval aviation furnished.

SLOANE

FLYING BOATS

For Sporting and Naval Use

OWL BOATS

For Over Water and Land Flying

SLOANE MONOPLANES

TRACTOR BIPLANES

and

Rear Propeller Gun-Planes

SLOANE AERO-SKIMMERS for sportsmen. Ideal for high speed travel on the water and delivery use on shallow streams.

GNOME—ANZANI—RENAULT, at lowest prices

Aeroplanes built to special design. Designs developed. Parts supplied—In fact everything aeronautical furnished.

Sloane Aeroplane Co.
1733 Broadway :: New York City

AERONAUTICAL RADIATORS

Built in capacities and types for standard and special aviation motors

Write for prices on standard makes. Send your specifications for special designs

EL ARCO RADIATOR COMPANY
64th St. & West End Ave., New York City

Also Manufacturers of Automobile Radiators of all types

BOLAND AEROPLANE AND MOTOR COMPANY

THE BOLAND MOTOR

8 cyl. "V" type 60 H.P. 240 pounds.

RELIABILITY DURABILITY
MAXIMUM POWER. MINIMUM WEIGHT.

THE BOLAND TAILLESS BIPLANE

equipped with the Boland Control (two movements) and BOLAND MOTOR.

THE BOLAND CONTROL is the embodiment of utmost safety and simplicity in a new system of control which is basic in principle. Write for particulars.

Factory: Ft. Center St., Newark, N. J.
Office: 1821 BROADWAY, NEW YORK.

PEDERSEN OIL PUMPS

have positive action, are small and light, easily applied to any motor

Write for circular

PEDERSEN LUBRICATOR CO.
636-644 First Avenue, New York, U. S. A.

CAPITALIST or PROMOTER

Wanted

Will try to cross the Atlantic in shortest possible time with my new type airship

A Practical Accomplishment

WALTER V. KAMP, 551 W. 178th St., New York

News In General

CURTISS AIR BOAT TO CROSS ATLANTIC.

Rodman Wanamaker is having built by the Curtiss Aeroplane Co. a huge flying boat in which an attempt is expected to be made to cross the Atlantic in its smallest dimension during the year.

At the present "state of the art" it has been thought improbable that crossing the pond would be accomplished. However, Curtiss has done a lot of things people said he couldn't do, and this may be one of them. There are plenty of battleships scattered about this little sphere. Perhaps this country, England, France, Germany and others could be induced to distribute a chain of boats along the projected route. At best, they would be some considerable distance apart; at the same time, any safeguard is better than none and it might be possible, by traveling at a great height, with powerful glasses, to almost keep a battleship in sight at all times.

GLOBE AIR RACE.

It is claimed the Panama-Pacific Exposition has offered $150,000 in prizes for an air race around the world, open to all types of craft, and will raise $150,000 more.

AERO CLUB OF PHILADELPHIA DINNER.

The first annual banquet of the Philadelphia Aero Club was held February 5th. The speakers were: Marshall Reid, Henry M. Neely, William D. Harris, Ulysses S. Wilson, E. R. Brown, Dr. George S. Gassner. Percy Pierce was toastmaster. The club was founded in 1911 and in the first two years many records were made in model flying. An incomplete aeroplane has been presented to the club.

STEVENS' LIFE PACK AGAIN DEMONSTRATED.

On February 4, Leo Stevens' "life pack" was again employed by moving picture people for a sensational film. With two taxicabs, Rodman Law and Miss Constance Bennett started across Brooklyn bridge and at the center leaped out and climbed over the rail and—dropped. If this had happened in France, the papers and magazines would have been full of the "wonderful" feat. Here, however, where the idea originated, such feats are so common they scarcely call for comment. The "pack," as everyone knows, is merely a silken parachute properly folded in a little bag strapped to the shoulders. When the jump is made, the 'chute opens in 20 or 30 feet.

TALIAFERRO'S RECORD TRIP.

The official report of the trip of Lieut. Taliaferro, on January 20 from North Island, Cal., via Los Angeles and Pasadena to Elsinore, shows that he covered 224 miles in 3 hours and 50 minutes, an average of 58.4 miles per hour.

Taliaferro flew at an average altitude of about 5,000 feet. Having obtained gasoline and oil from Elsinore, he flew to a point six miles southeast of Temecula, landing there on account of the engine having stopped. He flew back to Elsinore, spending the night at that place (total distance in air for the day 270 miles; total time in air 4 hours and 41 minutes). Leaving Elsinore at 9:30 a. m. on the morning of January 21, he continued his flight until eight miles west of Corona, where the engine stopped on account of the poor gasoline obtained at Elsinore. He landed in the only possible landing place in that part of the country, a very muddy, newly plowed field, at 10:08 a. m. (distance 35 miles, time 38 minutes). The field where he landed was so soft that the wheels sank into the ground to their hubs. This field was surrounded on three sides by high hills and trees, and a swamp on the fourth side, and as there was no place within a radius of 5 miles from which he could take to the air he deemed it inadvisable to continue his flight. He dismounted the machine, loaded it in a box car, and shipped it to San Diego by rail. The machine used was a Curtiss speed scout type, with Curtiss OX 90-100 horsepower engine.

The summary of the reports from San Diego for the week ending January 24 shows 110 flights, 45 passengers carried; total time in air 25 hours and 28 minutes. Since January 1 to January 24, there have been 306 flights, 140 passengers carried; total time in air 77 hours and 52 minutes. In the above total are included three cross-country flights of 85, 134 and 220 miles.

IMPORT AND EXPORTS.

Imports.	
For November	......
11 months ending November 1, aeroplane and parts	$19,625
Exports of Domestic Manufacture.	
For November, 2 and parts	15,379
11 months ending November, 18 and parts	79,554
Exports of Foreign.	
For November, none	
11 months ending November, 2 and parts	11,232
In Warehouse, November 30.	
3 Aeroplanes	7,623

NEW ALTITUDE FLIGHT ENDS FATALLY.

After making a new American altitude record of 12,120 feet at San Diego, February 9, Lieut. Henry B. Post, army aviator, was killed, after descending safely to within some 600 feet of the earth. It is reported that at that height "the plane was seen to collapse" and the pilot was thrown clear of the machine into five feet of water. The Signal Corps will, of course, make an official report.

The altitude record has been held by Beachey who made 11,642 feet at Chicago in 1911. Lieut. Post's best flight was one of 152 miles in 2 days. (See issue of January 31.)

NILES FLIES UPSIDE DOWN.

C. S. Niles, second in the race around New York, a former Curtiss and Thomas biplane flyer, flew a Moisant monoplane upside down in a most sensational and heart-stopping flight at Mineola on February 3. In attempting to make the loop, it is reported the machine dropped tail first before getting completely over, but Niles was able to recover.

SCOTT TO DROP BOMBS.

Lieut. Riley E. Scott is on his way to San Diego to resume bomb dropping experiments after those made with mediocre results at Washington two years ago, due to inability of the machine used to lift the weight.

INTERNATIONAL BALLOON RACE.

R. H. Upson and Capt. H. E. Honeywell have so far been selected as two of the team to represent Uncle Sam in the big race from Kansas City, October 6. It is apparent that there will be no national race this year to select the team as originally urged by AERONAUTICS, finally put in practice and as has been the custom for the past three years.

AVIATOR IN AIR SIXTEEN HOURS.

Munich, Feb. 8.—The aviator Ingold broke the world's record for a cross country endurance flight. He remained in the air for 16 hours and 20 minutes, and covered a distance estimated at 1,050 miles without landing. Ingold started at Mulhausen, Alsace, and flew far to the north. He then proceeded southward to Munich, landing in a suburb.

Johannisthal, Feb. 3.—The aviator Brunolanger today broke the world's record for an endurance flight. He remained in the air for fourteen hours and seven minutes.

OFFICIAL BULLETIN

OFFICERS.

Clarence P. Wynne, *President.*
Jos. A. Steinmetz, *1st Vice-President.*
Wm. D. Harris, *2nd Vice-President.*
George S. Gassner, Secretary
Laurence Maresch, *Treasurer.*
Office of the Club, Bellevue-Stratford, Phila., Pa.

NOTICE TO MEMBERS.

Members of the Aero Club of Pennsylvania in good standing will receive semi-monthly copies of AERONAUTICS as one of the benefits of membership, together with the monthly journal "Flying." By this arrangement, A. C. P. members obtain more from a magazine standpoint than those of any other club in the country.

DEMAND FOR CHARAVAY

That the consistent good work of Charavay propellers and the high quality of construction is upholding their enviable reputation for efficiency and long service is evident from the number of new orders and repeats orders that the Sloane Aeroplane Company is continually receiving

The Sloane Aeroplane Company has just brought out a new 3 bladed type for flying-boats and tractors, the first of which was delivered to the U. S. Navy. No propeller is allowed to leave the factory before being inspected by an expert as to correct pitch and balance. The balancing is accomplished on a special ball bearing bracket and the weights of the blades are not allowed to vary a fraction of an ounce.

Amongst recent purchasers are the governments of the United States, Guatemala and Mexico, Moisant International Aviators, Capt. Thomas S. Baldwin, Capt. Hugh L. Willoughby, Lieut. J. M. Murray, Richmond Aeroplane Co., Lieut. Walb, Maximillian Schmitt, Benoist Aircraft Co., R. V. Morris, and E. B. Ford, son of the famous maker of Ford cars.

ST. PETERSBURG LINE ADDS NEW ROUTE.

The St. Petersburg-Tampa Airboat Line, established by the Benoist Aircraft Company of St. Louis, has issued a statement of its first month's business, covering the 31 days of January. With no Sunday flying, this left only 27 possible days of operation. In these 27 days, 97 trips were made. Out of these, 4½ days of flying were lost, 3 days loss was caused by a broken crank shaft in the motor, and the balance ascribed to bad weather.

There were carried in all, 184 passengers, and the boat made a distance of 2,234 miles, or 4,468 passenger-miles, which surely compares not only favorably, but much better than the usual taxicab or automobile used for commercial work.

The line has proved highly remunerative, as the cost of up-keep has been much less than for the same work with an automobile, and the amounts received for the work have, of course, been greater.

The first understanding was that this line was to be operated for three months during the tourist season, but the business men have been so delighted with the performances of the boats that they are now making arrangements to continue the line clear through the summer and fall, and increase the number of machines to a great extent for next winter.

Two more machines have been received now and are to be put in active service.

Another line is contemplated between St. Petersburg and Tarpon Springs, a distance of about 45 miles. This to make stops at Pass-A-Grille, Clearwater, Bellair and Tarpon Springs.

AERO MART

NATIONAL AVIATION FUND NOV $1,270,000.

Paris, Feb. 1.—The national subscription for tl French aerial war fleet amounts to $1,270,000, accor ing to announcement made by Senator Reymon president of the National Aviation Committee, a the fund will enable the committee to present to tl army 210 aeroplanes, pay for the training of expert pilots and erect 70 aeroplane sheds. It is i tended to establish a complete system of milita air ports throughout the country, so that milita aeroplane pilots will be able to acquire an intima knowledge of every part of France without ever bei out of reach of shelter and needful supplies.

San Francisco and the Hall-Scott concern are d veloping an intrepid flock of flying men. Roy Franc' Otto Rybitzki, W. H. Blakley, Alfred Barrett, Charl Bryant, R. G. Fowler, Silas Christofferson, and l brother Harry; and, until quite recently when l family objected, Adolph Sutro.

Each Sunday, when the weather is favorable, a that has been every Sunday since the beginning the enterprise two months ago, a flying tourname so to say, has been held on the Exposition groun

George A. Gray, a Wright flyer of more or le repute, is reputed to have looped the loop at Atlan Beach, Fla., on January 25. Strange to say, accor ing to the newspaper reports, he flew his "aeropla upside down."

NEW BENOIST AIR BOAT.

The new Benoist Airboat "45" has been received St. Petersburg and put in active service on the S Petersburg-Tampa line. This boat is about the sa as the previous models, with several refinements a a new wing that has demonstrated much greater e ciency over the old one. It created much surpri around the areo camp when Jannus got ready to ma his regular trip to Tampa after trying out the n chine, and announced that he would take two passe gers instead of one. Two passengers were quick loaded in and Jannus had no trouble at all in g ting these out of the water and made the round tr on schedule time. Each of the two trips were ma that day; several special flights were made and t machine tallied up over 100 miles for the first d equipped with but a 75-h.p. Roberts motor.

It will be noticed by examination that it has mu cleaner lines than the older 'plane; motor much mo accessible; chain guards and back part of the mot exposed, making it much more efficient for the rad tion of heat, while the hood has a new curve, whi eliminates a lot of spray and the strong wind th blows in the passengers' faces in the old boat.

It has a spread of 42 ft.; a gap of 6 ft. and chord of 5 ft. 2 in. The complete machine, ready fill up, weighs 1,250 lbs. On the regular Tampa tri with two passengers aboard, besides the aviator, th take enough gasoline for the round trip and th some for emergencies—about 22 gallons in all. T gasoline and water cooling weighs about 150 lbs.

AERONAUTICS
Combined with "FLY"

Published Semi-Monthly by Aeronautics Press
122 E. 25th St., New York
Cable: AERONAUTIC, New York
'Phones 9122 / 4113 Madison Sq.

A. V. JONES, Pres't — ERNEST L. JONES, Treas'r-Sec'y
ERNEST L. JONES, Editor — M. B. SELLERS, Technical Editor
HARRY SCHULTZ, Model Editor

SUBSCRIPTION RATES
United States, $3.00 — Foreign, $3.50

No. 79 — FEBRUARY 14, 1914 — Vol. XIV, No. 3

Entered as second-class matter September 22, 1908, at the Postoffice, New York, under the Act of March 3, 1879.

¶ AERONAUTICS is issued on the 15th and 30th of each Month. All copy must be received 6 days before date of publication. If proof is to be shown, allowance must be made for mailing.

¶ Make all checks or money orders free of exchange and payable to AERONAUTICS. Do not send currency. No foreign stamps accepted.

AERONAUTICS

WITH WHICH IS COMBINED FLY

Official Organ and Bulletin—Aero Club of Pennsylvania
The Aeronautical Society

The New Benoist Flying Boat in Action

BENOIST

ANNOUNCEMENT

The Benoist School of Aviation now open at St. Petersburg, Florida. The school is under the personal supervision of Tom W. Benoist and Tony Jannus.

We also conduct the first regular schedule passenger-carrying air line in the world, St. Petersburg to Tampa, Fla.

Students who want to join the school and prospective agents who want their territory for the exclusive sale of our flying boats will do well to address

BENOIST AIR CRAFT COMPANY

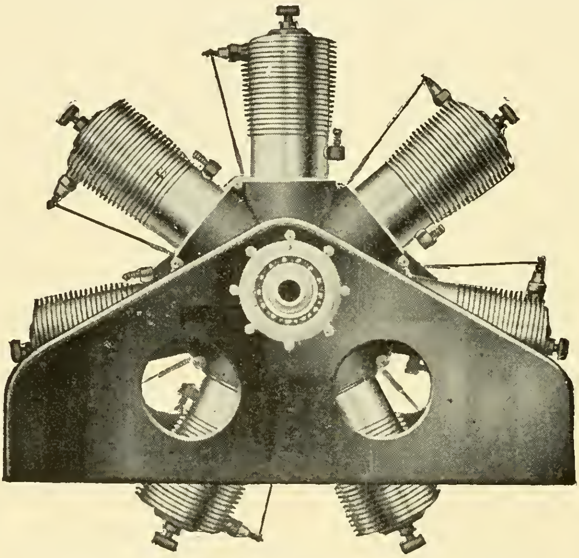
St. Louis, Missouri or St. Petersburg, Florida

---

50 H.P. 160 POUNDS

GYRO MOTOR

80 H.P. 207 POUNDS



Built of Nickel Steel and Vanadium Steel Throughout

Endurance Flying Record to Date, 4 hrs., 23 min.

From

"FLIGHT"

July 26th, 1913

"Some may say—to the obvious benefit of the Company whose representatives have adopted his very practical method of calling attention to the GYRO engine (50 h.p.) that it is ***all due to the motor,*** which probably develops about three times as much power as the machine requires for the purposes of straightforward flight."

Send for Catalog

THE GYRO MOTOR COMPANY, 774 Girard Street, Washington, D. C.

"REMARKABLE PROPELLERS"

Are those which are able to show results anywhere near to the ordinary performance of two- and three-bladed **PARAGONS.** The making of constant change, refinement and improvement is a feature of all **PARAGON** designing, but here are a few figures for the year 1913 :

Report of Curtiss Aeroplane Co., February 8, 1913.

Curtiss 8′ dia. x 5′ pitch—Revolutions 1225—Flying speed 54.5 miles per hour.
Paragon 8′ dia. x 5′ pitch—Revolutions 1244—Flying speed 56.5 miles per hour.
Weight of machine 1335 lbs. Load carried 565 lbs. Total weight 1900 lbs.

Report of Gerald Hanley, Providence, R. I. (Curtiss Flying Boat) October 13, 1913.

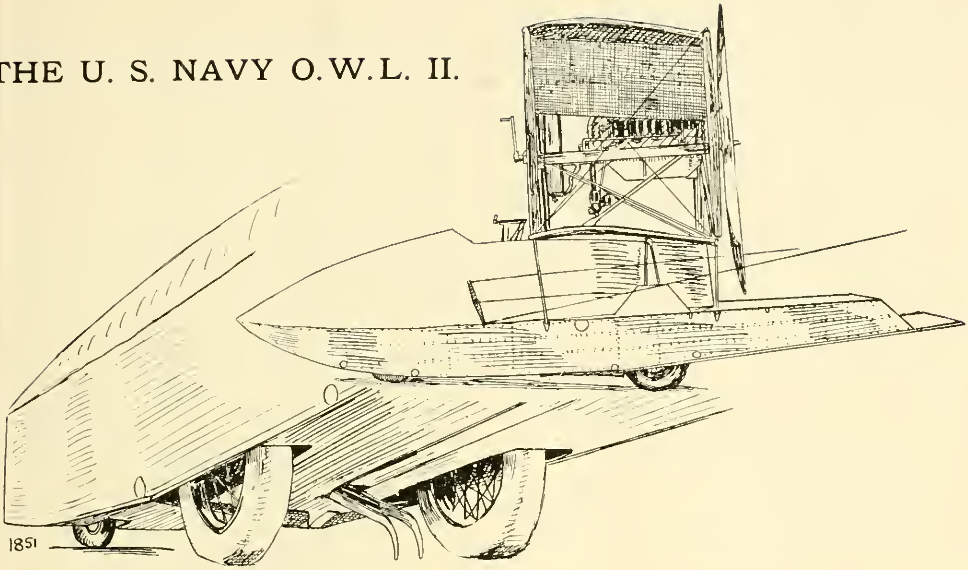
Curtiss two-blade, 8′ dia.—Rev. 1250, Thrust 480 lbs.—Rev. 1300, Thrust 505 lbs.
Paragon Three-blade, 7½′ dia.—Rev. 1250, Thrust 570 lbs.—Rev. 1300, Thrust 580 lbs.

Lieut. J. H. Towers reports to the Secretary of the Navy as follows:

"The three-bladed PARAGON gives more thrust and more speed than any propeller we have had."

THE AMERICAN PROPELLER CO., 243-249 E. Hamburg St., Batimore, Md.

THE U. S. NAVY O.W.L. II.



Hydroaeroplanes are said to constitute the eyes of the modern navy. The title applied to the most recent aid to naval vision, the "O.W.L." type, is not intended to suggest that these machines see well at night, but was selected by Captain Washington I. Chambers, at the head of the American naval aviation, to designate craft equally useful "Over Water or Land."

Glenn H. Curtiss produced the "Triad" in February, 1911 (see AERONAUTICS, April, 1911), and later adapted wheels to the flying boat (AERONAUTICS, March, 1913). The "Triad" was the first machine arranged for alighting on either land or water.

To Captain W. I. Chambers, of the Navy, is due the resuscitation of the type, and its present development into the O.W.L. boats built by Mr. Curtiss for the U. S. Navy during 1913.

The first machine of the new type was turned over to Lieut. B. L. Smith, U. S. M. C., last June and with it a long series of experiments was carried on. The combined weight of two aviators was some 370 pounds. The wings used were those of the "U. S. A-2," a Model E Curtiss hydroaeroplane acquired in 1911. The motor was a new Curtiss O-X, which gave the machine a mean speed of 65 m.p.h. but which showed in spurts a maximum of 70 m.p.h. In low speed trials landings were made at less than 40 m.p.h., or almost an exact duplication of some recent English trials, where a range of from 38 m.p.h. to 69 m.p.h. was shown and muchly advertised.

O.W.L. differs from the standard hydroaeroplane in that the pontoon, or hull, is wider, and it has a step similar to that of the standard Curtiss flying boat. The seats, instead of being attached to the superstructure as in the hydroaeroplane, or being in the hull, as in the case with the flying boat, are set on the pontoon.

A windshield is formed by a light framework, covered with water-proof fabric, built up to entirely surround and shield the operators.

The O.W.L. No. 2, illustrated here, is a more substantial machine than O.W.L. No. 1 and is probably the most advanced development of the type so far evolved

The pontoon is of very effective form, Vee-bottomed and pointed at the bow. Above it a high-decked body has been built which not only shields the operators from wind and spray, but would effectually protect them also in case of a long dive into the water.

Metal lined pockets in the hull carry the wheels and springs of the leading gear. These are dropped into position by the shifting of a lever, and locked, either up or down, by the movement of another lever, both within easy reach of the operator. Heavy coil springs take up the shock of shore landings. The gear can be raised or lowered while the machine is in flight, or may be entirely removed where only over water work is the order of the day. When the wheel gear is removed for exclusive water flight buoyancy may be increased by inserting water tight aluminum boxes into the wheel pockets.

Captain Chambers holds to the opinion that it is the ideal navy type for both the Marine Corps and the Sailors; that it is a necessity for Navy work which is to be executed mostly off coasts where either rocks or bad surfs abound or in the vicinity of land which is not generally suitable for an ordinary land machine and where communication must be kept up between the fleet and the base of operations on shore.

FOREIGN AERONAUTICAL MOTORS*

By the Staff Correspondent

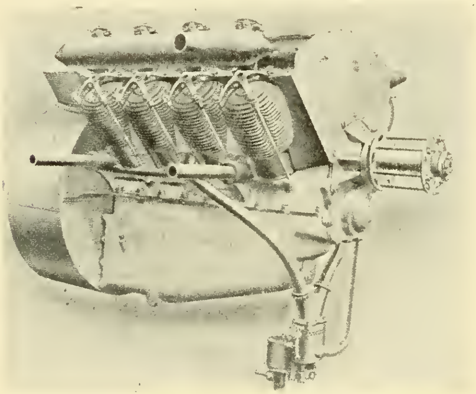
DE DION BOUTON.

The De Dion Bouton Automobile Co. exhibited an 80-h.p. motor which was almost identical to the 70-h.p. Renault, except that the cylinders had a somewhat larger bore, being 4 3-16 in. instead of 3¾ in., while the stroke remained the same as the Renault, 4¾ in.

It might be said that this motor was of somewhat neater design than the Renault, principally because of the fact that the cylinders were placed opposite each other, which shortened the motor somewhat. In this case, the connecting rods are not arranged the same as on the 12-cylinder Renault, but one rod yokes over the big end of the other, and oscillates on the outside, as is the De Dion practice in their 8-cylinder V automobile motors.

The carburetor is of the Zenith duplex type, having two chokes and a single float chamber, and is jacketed and heated by exhaust.

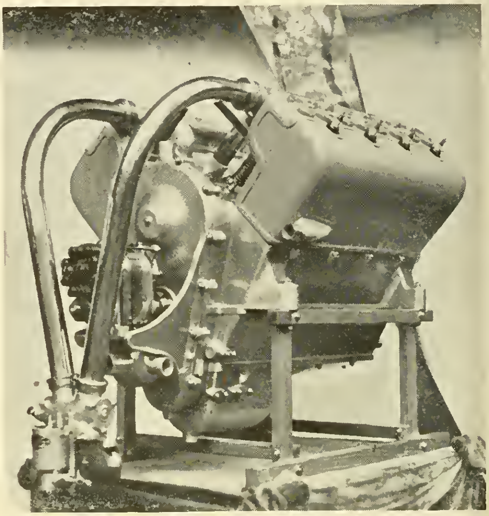
The motor develops its rated horsepower with the crank shaft turning 1,800 r.p.m., and the propeller is driven by the cam shaft at 900 r.p.m. The weight of this engine complete is 465 lbs., being practically the same per horsepower as the Renault. This is the only model of aeronautical motor which the De Dion people build at the present time and it has been on the market about one year. During this time it has become very well known in Europe, and one can find a number in use at the various flying grounds in France and also at Hendon, England. The engine seems to have given a good account of itself in the majority of cases, and is quite as well spoken of as the Renault.



None of these three motors which have just been described develops a large amount of pewer per cubic inch of cylinder capacity because of the fact that low volumetric efficiency and low compression are necessary in order to accomplish air cooling with cylinders as large as are used.

PANHARD-LEVASSOR.

The neatest designed engine of the type was a 100-h.p. 8-cylinder V, water-cooled motor exhibited by Panhard & Levassor, who are so well known in the automobile industry. The bore and stroke was 4 5-16 in. x 5½ in., and each group of four cylinders was cast en bloc and fitted with copper water-jackets. The cylinders are of the conventional L head design, and the valves are arranged all on one side at a slight angle from the vertical, in order to reduce the size of the combustion chamber.



Each group of four cylinders is, of course, arranged at 90 degrees to each other, and also are directly opposite each other, the connecting rods having a common big end bearing. The valves are operated by a single central cam shaft, which also is extended to form the propeller shaft, as is the case with both the De Dion and Renault.

This motor is fitted with one magneto operated directly from the crank shaft, which supplies a single spark to all eight cylinders, but the carburetor is of the double barrel type with single float chamber, which seems to be universally used on all 6, 8 and 12-cylinder engines. This is necessary because of the fact that the suction strokes on any engine of more than four cylinders overlap each other, and if supplied by single manifold and single carburetor, the inlet gas is drawn from one cylinder which has just filled to another which is just commencing to fill.

The crank shaft turns at 1,500 r.p.m. and the propeller shaft at 750. The weight of the motor complete, but without the radiator, is 440 lbs.

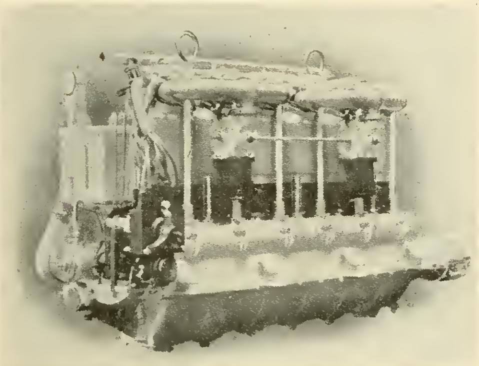
This motor has been little heard of as yet, although a similar engine was exhibited by the same concern at the Paris Salon a year ago, and it is rather strange that it has not made the progress that the De Dion has made in the same length of time. For 100 h.p. it is very much more compact and of lighter weight than the 12-cylinder Renault, even including the necessary radiator.

*Began in the Feb. 14 issue

AUSTRO-DAIMLER.

The Austrian Daimler Motor Co. exhibited one of their 90-h.p. 6-cylinder motors, which are already known in this country through the Wright Co. and the Thomas Bros. Aeroplane Co., each of whom has one at the present time.

The engine is of the 6-cylinder vertical type, having a bore of 4¾ in. and a stroke of 5½. Individual cylinders are used with electro-deposited cooper water-jacket, and valves at an angle in the head, operated by single rocker arm, as was formerly done on the Curtiss motor. The engine is arranged to have the propeller attached direct to an extension of the crank shaft, which turns at a normal speed of 1,300 r.p.m.



One Bosch magneto of the two-spark type supplies ignition to two different plugs in each cylinder simultaneously. The Bosch lubricator is also used, and this feeds a small quantity of fresh oil to each crank shaft bearing, while the rest of the motor is lubricated by splash. None of the oil is carried in the lower part of the base of the engine, except as required for the connecting rods to dip into, the fresh oil being supplied from an external tank. This is a decidedly different system from the circulating system most generally used, and although it is rather more complicated and unsightly because of the necessary external oil tank, it has the merit of supplying fresh, cool oil to each bearing, and probably shows a better oil consumption than is possible with the circulating system.

Two carburetors are fitted, each supplying two groups of three cylinders. These are separate instruments with individual float chambers and not of the duplex type with single float chamber referred to above, but the throttle valves are carefully synchronized, and the two instruments undoubtedly operate as one. The manufacturers claim that the weight of this motor, including the radiator, is 360 lbs., which is exceedingly light for an engine of this type and power.

This company also builds 40, 65 and 120-h.p. engines, all of the same type and same general construction, except that the two smaller sizes have only four cylinders. The large size model was first brought to the attention of the world when Cody won the British War Office Trials with a machine of his own design fitted with a 120-h.p. Austro-Daimler motor.

ON LATERAL CONTROL.

A REPLY TO MR. STILL BY ALBERT ADAMS MERRILL.

In the December, 1913, number of AERONAUTICS there is a letter from a Mr. Still on lateral control referring to a previous article by me. This letter shows that Mr. Still does not understand my statements relative to the reversed Farman system. When I state that with this system stability is maintained without the use of a vertical rudder I do not state that the machine will fly straight; in fact, it will not. But the point is that this system will check rotation about the longitudinal axis without the use of the vertical rudder. Therefore, it is reducible to practice and does not infringe either Claim 3 or Claim 7 of the Wright patent.

I wish American readers would remember that of the machines flying, the vast majority use either the Wright or the Henry Farman systems. The Curtiss is used very little, in spite of the fact that here we see quite a few Curtiss machines. The flying done in this country is practically nothing in comparison to what is done abroad and, as yet, comparatively few Curtiss machines are used abroad. I personally like the Curtiss system and my criticism is of the Wright and Farman systems; also in proportion as the negative angle aileron is given the most work the Curtiss system improves. Yet plainly the Curtiss infringes Wright's Claim 3 because it consists of a simultaneous movement in opposite directions of the marginal portions of the supporting surface. Every aileron at a positive angle is a supporting surface.

In the reversed Farman system a proper relation of the moments inertia about the three axes and a proper disposition of the center of side pressure would cause the machine to come back to a straight course without turning the rudder. It is simply a question of offsetting couples and the effect of the time element on the rotations about the two axes, longitudinal and vertical.

"Bud" Mars has looped the loop matrimonially and married his former wife. Harry Atwood has become engaged.

Reports of Masson's death as a spy have been greatly exaggerated. The Mex. batting average is not high.

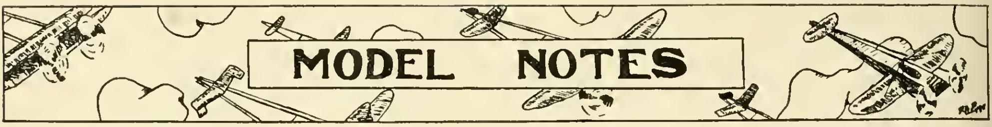
For details, illustrations, plans, descriptive matter, and general character, it would be hard to beat AERONAUTICS. Wouldn't miss it for anything.

Yours sincerely,

P. J. P., Seattle.

Eufaula, Ala., is to have an exhibition on April 8.

Portland, Ore., wants to have a balloon race for the Rose Festival on June 12. Chance for the balloon men to get busy.



THE FUNK R. O. G. MODEL.

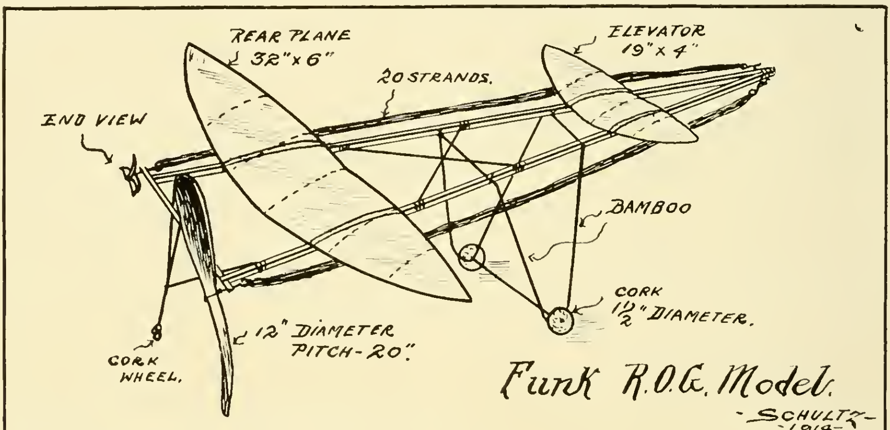
By Harry Schultz, Model Editor.

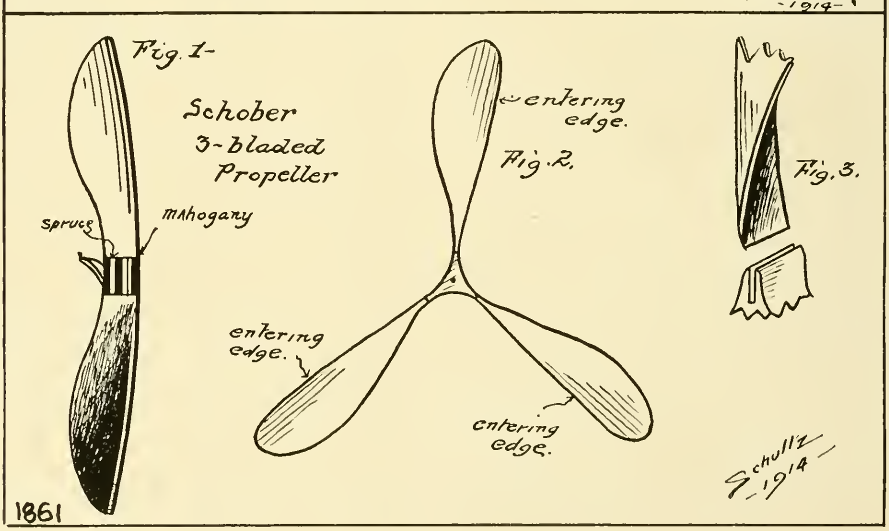
The model shown in the accompanying drawing was constructed by Mr. R. Funk, of the Long Island Model Aero Club, and at the present time is the holder of the world's record for distance for models rising from the ground, with a flight of 1,620 feet. In all contests in which this model was entered it showed its wonderful flying ability by winning each time, in spite of the very gusty winds and inclement weather prevailing.

The fuselage is constructed of two strips of spruce 5-16 x 1-4 in., tapering toward their ends. It is in the form of a triangle, braced at its center by an "X" bracing of bamboo, as shown. The rear brace or propeller bar is of split bamboo ¼ in. wide and 13 in. long. The propellers are made of birch, steamed to shape, and have a pitch of about 20 in. and a diameter of 12 in. The bearings are of the usual type, consisting of small pieces of tubing and washers.

Each propeller is driven by 20 strands of ⅛-in. flat rubber. The large plane is constructed of flat steel wire 1-24 in. by 1-32 in. in thickness. The ribs of the plane are mounted on a strip of white pine, 7-16 in. in width by 3-32 in. in thickness. The main plane measures 32 in. in span, with a chord of 6 in. in its center. The elevator is 19 in. in span, with a chord of 4 in. in its center, and is constructed in precisely the same manner as the rear plane. Both planes are covered with silk paper treated with celluloid solution and are secured to the frame in the usual manner by rubber bands.

The chassis or running-gear is constructed





of split bamboo, the front side members each being in the form of a "U," joined together by bars extending across the frame and acting as a brace for the same. The wheels are made of cord, fitted with tubing acting as hubs, and these wheels are mounted on an axle made from an ordinary hat-pin.

The rear portion of the chassis is made of bamboo, to which is secured a small cork wheel ½ in. in diameter. The front chassis, including the wheels, is 9⅛ in. high; the rear skid, including the wheel is 7 in. high.

As above stated, this model has made a flight of 1,620 feet, but has practically flown over 1,000 feet on every flight made by it.

THE SCHOBER THREE-BLADED PROPELLER.

Three-bladed propellers are fast coming to the fore among the model builders, and many different methods of constructing them are known. One of the chief difficulties of making this type of propeller is securing the blades at the center, or hub. One of the best methods of doing this, and obviating the necessity of an awkward and weighty hub, is shown in the accompanying drawing, which is the idea of Mr. Frank Schober, lately connected with the Curtiss company.

The hub of the propeller is laminated from strips of spruce and mahogany, as shown, and is in form the general outline of a triangle. At each point of the triangle are saw-cuts or slots into which the three blades, which are made of birch and are bent to shape by steaming, are inserted and glued therein. When the glue becomes hard all the surplus wood around the hub is cut away, and the propeller is carefully sand-papered and schellaced or painted, as desired.

It might be well to state, however, that these propellers are very unsuitable when used singly, as they exert a tremendous amount of torque, and if used singly a propeller of this type should be set slightly to the side of the model in which the propeller turns, instead of at the center line of the model.

In the next month-end issue of AERONAUTICS I will describe the Schober model flying boat. This should prove of interest to all model builders, as, so far as I am aware, it is the first model of this kind to be a success.

SLOANE 220 H.P. AERO-SKIMMER.

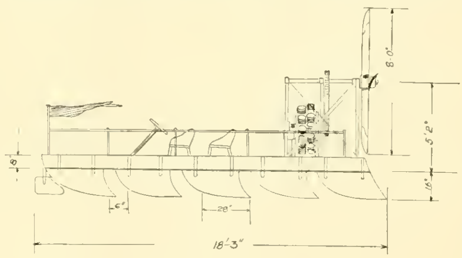
By Walter H. Phipps.

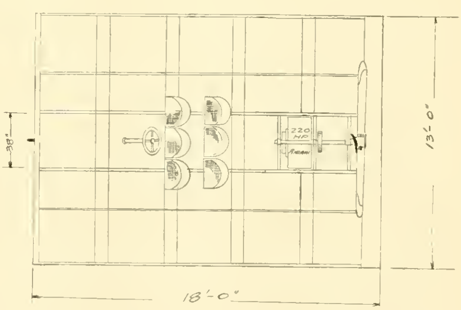
The new aero-skimmer, or gliding boat, built by the Sloane Aeroplane Company of New York for Robert J. Collier, is the first of its type ever constructed in this country, and doubtless the highest powered in the world. It was designed specially for Mr. Collier by John E. Sloane and Aviator Frank Coffyn. In general appearance the craft resembles a huge bob-sled, and in fact when traveling at speed it greatly resembles one, for it glides swiftly over the surface of the water in a similar manner to a sleigh over the ice. Since this one was produced, another has been ordered by another prominent sportsman.

The Sloane Aeroplane Company expects to sell a number of these gliding boats during the spring and summer for pleasure and commercial use, for, owing to their high speed and shallow draught, they are valuable on shallow streams and in the tropics.

General Dimensions: Length, 18 ft. 3 in.; width, 13 ft.; depth of hull, 2 ft.; depth of hydroplanes, 16 in.; number of hydroplanes, 5; width of hydroplanes, 28 in.; length of hydroplanes, 13 ft.; motor, 220 h.p. Anzani; seating capacity, 6 people; speed, 60 miles per hour.

The chief novelty of the boat is the hull, which is of unique design. It consists of five very wide and narrow hydroplane surfaces, each measuring 13 ft. by 20 in., attached one behind the other to a girder frame work, with a 6-in. air surface between each one. This arrangement gives the utmost possible planing surface with the least possible drag and suction, which accounts for the tremendous speed of the

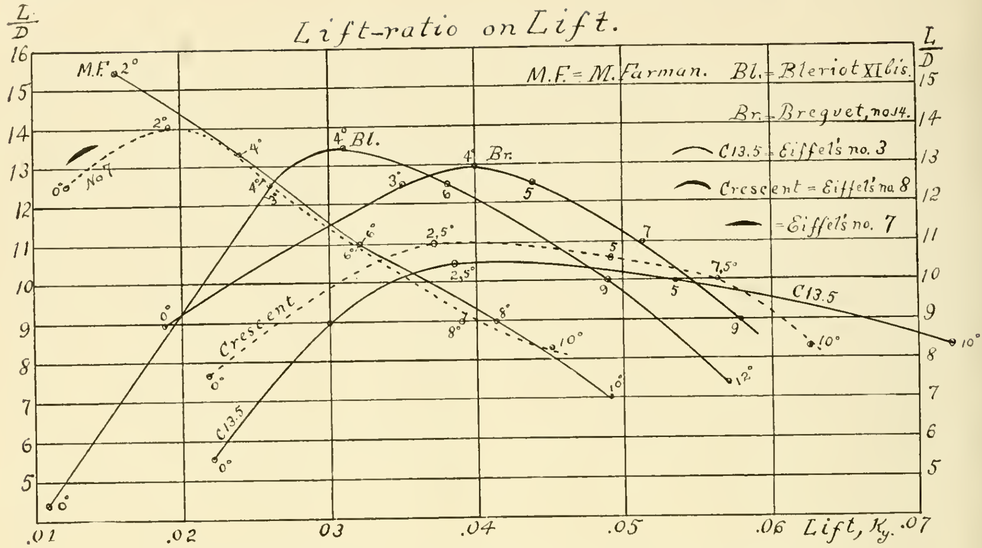




new craft—just over 60 miles an hour, which is faster than the fastest motor boat.

The construction of the hull is both simple and strong. The five hydroplane surfaces, which are of two-ply wood construction are bolted and fastened to four main

(Continued on next page)



TECHNICAL TALKS—By M. B. Sellers

COMPARISON OF LIFT-RATIO AND LIFT OF AEROFOILS.

Lift-Ratio Plotted on Lift.

In comparing several wing profiles to determine their relative suitability for a given aeroplane, it is essential to compare the lifts as well as the lift-drift-ratios or efficiency, and I have for some time employed a method of doing this which I believe is new, and which has proved so useful to me in presenting these important properties to the eye and mind that I would like to make it public. It consists in plotting the lift-ratio on the lift.

In the figure herewith the abscissas give the metric unit lift (Eiffel's K_y), and the ordinates the lift-ratio, K_x/K_y, or efficiency. Thus, the higher a curve extends the greater the efficiency; and the farther to the right, the greater the lift. The angles of attack are given at the determined points on the curves.

The profiles here considered are those in Eiffel's work, which seemed of most practical importance, and the values used in plotting the curves were those given in the "Annex."

It is seen that the maximum efficiency for the Breguet is slightly less than that for the Bleriot, but its lift for any lift-ratio below 13, is greater than that of the Bleriot. Below a lift-ratio of 10, the Crescent and C-13.5 give greater lift.

An important consideration in comparing profiles is the thickness. Within certain limits, the thinner a profile of any type, the more efficient it is. The Maurice Farman (M. F.) has a higher maximum efficiency than the No. 7; but it has a thickness of only $\frac{1}{14}$ of the chord, while that of the No. 7 is $\frac{1}{15}$ of the chord.

The maximum ordinate of the No. 7 is at the center. M. Eiffel tested two profiles, Nos. 16 and 17, having the maximum ordinates at $\frac{1}{3}$ and $\frac{1}{5}$ of the chord from the front. These gave lower maximum efficiencies than the No. 7, but higher lift and efficiency at large angles. There is, however, a want of agreement between the tables on p. 143 ("Annex") and the curves plotted on p. 100; the values given for No. 17 being used in plotting the curve designated as No. 16, and vice versa. There is evidence elsewhere indicating that the tables are correctly designated, and my own experiments also indicate that the maximum ordinate should not be nearer the leading edge than $\frac{1}{3}$ of the chord. More experiments are needed to determine this point.

SLOANE 220 H. P. AERO SKIMMER

Continued from page 55

beams, each measuring 8 in. deep by 2 in wide, and which run the full length of the boat. These main beams are in turn cross-braced with wooden spacers and rigidly fastened to the sides of the hydroplanes by large steel plates. The two center main beams carry the six seats for the operator and passengers, directly in the center, and at the rear are the supports for the 220 h.p. 20-cylinder air-cooled Anzani motor, which drives through a special adjustable bracket shaft and double-chain arrangement the 8-foot four-bladed propeller.

The rudder, which is operated by an automatic steering wheel, is situated at the extreme front of the boat.

The company is putting on the market a number of different sizes and styles of these gliding boats, which will range in power from 35 h.p. up to several hundred h.p. In addition, that are marketing a light canoe glider fitted with a small Charavay propeller, which can be driven by any suitable motorcycle engine of 5 to 10 h.p. A special Charavay propeller for one of these craft has just been supplied by the Sloane Aeroplane Company to E. B. Ford, son of Henry Ford, the noted automobile man.

News In General

WRIGHT PATENT SITUATION.

Since the adjudication of the Wright patent in the United States Courts, no action has thus far been taken by the Wright Company as to either restraining infringing makers or granting licenses to operate. Letters have been sent to such companies, however, asking for a statement of the machines built to date, selling prices, moneys received from the sale of machines and parts, and the balance sheet. Letters have also been sent out generally warning purchasers, fair managers, etc., not to contract for infringing machines.

As to what action will be taken upon the receipt of replies to these letters to manufacturers, the Wright Company is silent. The company has been assailed by queries of all kinds and rumors are thick. Some say licenses will be granted to those who come forward with frank statements and arrange for settlements; others intimate that but two or three companies, after having obtained ample capital, will be licensed; another rumor suggests that the victorious company holds to the opinion that it can manufacture all the aeroplanes likely to be required in this country; it is probable the rumor that a combination of the infringing makers will be granted a license has as much foundation in fact as any of the others.

It is obvious that competition is the life of trade, and it might be suggested that were Ford the sole manufacturer of automobiles he would sell less cars a year than he does to-day with the vast number of other builders soliciting business. It would not be good business, it has been pointed out in all directions, to follow the policy that the Wright Company can manufacture all the aeroplanes likely to be purchased in this country. It is argued that while that would assuredly be physically possible, such policy would result in prompt diminution of the present demand, not to mention the probable total elimination of the expected general sporting interest in flying, which era, due to the advent of the flying boat, has seemed of late almost at hand.

All who can afford it do not buy Packard cars. Some prefer the Peerless. Those who cannot afford expensive cars are satisfied with those of less price. If flying is to progress at all and if there is to be any industry, the public must take up flying to a vastly greater extent than it has. There must be machines of different makes and varying in price. Selling only to the Army and Navy is clearly profitless. It is undeniable that aviation must look to the public for support. It is obvious that for the general advancement and from even the selfish interest and dividend point of view of the owner of a controlling patent in aeronautics, it is more advantageous to reap a certain sum from a thousand aeroplanes produced than from a hundred.

An analogous situation is in the automobile trade. The owners of the Klaxon horn patents won their infringement suits and shortly after granted licenses to the very makers against whom they instituted infringement action. The license permits manufacture on royalty of the infringing horns in their present form and shape, and carries with it recognition of the validity of the Klaxon patents and consent to issuance of injunctions. The infringing horns were sold at a cheaper price.

The owners of this patent, from this attitude, evidently assume the position that it is to their financial advantage to have competition.

BURGESS COMPANY AND CURTIS WITHDRAW FROM AVIATION FIELD.

As is generally known, in the early part of 1911 the Burgess Company and Curtis made a license contract with the Wright Company for the use of all Wright patents during their life, the consideration being a definite royalty of $1,000 on each machine manufactured.

During the first year, Burgess aeroplanes very similar to the Wright type were manufactured and generally sold. It was on one of these that the first long cross-country flight was made in America—that of Atwood, from St. Louis to New York. Other Burgess machines were prominent in exhibition and sporting use during the year.

Mr. Burgess developed the first successful hydroplanes for this type of flying craft, and these were immediately sought for by such sportsmen as W. E. Scripps of Detroit, R. J. Collier of New York, and by the Navy Department. Early in the following year Mr. Burgess departed from the Wright type of aeroplane to types of his own design, built to meet the special requirements of a growing trade.

The Burgess Tractor, exhibited in New York at the last Aero Show, is perhaps the best known. It was built under an order from the U. S. War Department and later delivered to the army, and it was on this machine that Lieut. Milling, with Lieut. Sherman, flew from Texas City to San Antonio, establishing the then American cross-country passenger record as well as the American passenger endurance record.

The Renault aeronautical motor was introduced by the Burgess Company into active service in both the army and navy, where it has become practically the standard for highest efficiency.

In the spring of 1913 the first Burgess flying boat was designed and constructed, with many original features, such as a triangular construction of steel girders. Notwithstanding the fact of its great weight, its evident strength and comparatively low-powered motor, it passed its naval requirements without difficulty. Since then other flying boats have been constructed with like success.

The Burgess Coast Defence Hydro, of the double pontoon variety, and a number of tractors were delivered to the War Department during the same year, all of which machines have been fully described in AERONAUTICS.

"The Burgess Company, during the long adjudication of the Wright patents, many times delayed, paid its royalties of $1,000 per machine, regardless of the fact that it was not receiving any protection or any other benefits in return," reads a statement issued by the Burgess Company. "Payments were continued without interruption, in anticipation of the time when the Wright patents would be adjudicated and the licensees should be protected against infringers.

"Coincident with the court decision early in 1913, upholding the Wright patents, the Wright Company became dissatisfied with the royalty of $1,000 per aeroplane and sought pretexts to cancel the existing contract, at the same time requesting the Burgess Company and Curtis to become licensees under a new contract, which called for increased royalties amounting to 20 per cent. on all sales, including aeroplane parts, motors and other product not patented or subject to patents by the Wright Company.

"Many have considered that the royalty under the original contract with the Wright Company, of $1,000 per aeroplane, was excessive, and a thorough test by the Burgess Company and Curtis, working under this royalty license for three years, has proved this to be the case; as while their business has steadily grown, it has been run at a loss. So the suggestion to increase the royalty on finished machines and to apply a similar royalty to parts not patented by the Wright Company was equivalent to stifling any possible business as Wright licensees, and after mature consideration the directors of the Burgess Company and Curtis decided to withdraw from the aviation field rather than to endeavor to operate under prohibitive conditions."

THE BURGESS COMPANY FORMED.

The Burgess Company was organized the latter part of January. It will occupy the plant formerly occupied by the Burgess Company and Curtis, and will build aeroplanes under the Dunne patents, as well as aeroplane parts, motors, speed boats and yachts. The officers are W. Starling Burgess, president; Greely S. Curtis, treasurer, and F. H. Russell, manager. Mr. Greely S. Curtis, whose interest in aeronautics dates back to experimental work with Lilienthal in Germany, has not lost any of his enthusiasm in the development of the art. His engineering skill has been of great value to his associates in the past, and his continued connection in the industry cannot help but be a strong factor in future development.

F. H. Russell, manager of the Wright Company until the development of the hydro-aeroplane by Mr. Burgess, in the fall of 1911, and since manager of the Burgess Company and Curtis, will assume the management of the Burgess Company.

It will be the policy of the Burgess Company in all of its work to maintain the highest standard of quality and the broadest business co-operation toward its competitors, with the one aim constantly before it of developing the flying machine into a safe vehicle for military, sporting and commercial purposes.

As stated some time ago, W. Starling Burgess, of Marblehead, obtained the exclusive right for the manufacture of the Dunne aeroplanes in America. Before this contract was made, a very careful study was made by Mr. Burgess in England of the operation of the Dunne machine (AERONAUTICS, Sept., 1913), and he became convinced that the development of aviation would be along the lines of inherent stability, as distinguished from the manually controlled types of the past and the mechanically operates types which are now presenting themselves.

The Dunne machine, which is claimed to be non-infringing, has never been adapted to marine flying. Mr. Burgess's particular aim during the spring will be the experimentation and construction of the Dunne machine equipped with hydroplanes. Already one machine has been constructed and flown among the floating ice of Marblehead Harbor, and so far the experiments lead to the belief that a complete solution of the inherently safe flying boat is at hand.

The Hacker Safety Hydro-Aeroplane Company, of Brooklyn, has been incorporated with a capital of $75,000, and the following directors: David Hacker, of Brooklyn, and Paul Sussman and Harry Lapin, of New York City.

THOMAS BROS. ISSUE CATALOGUE.

The catalogue just issued by the Thomas Bros. Aeroplane Co. has an interesting chapter on "Accidents and Their Causes," which has been written with a view to endeavoring to disabuse the public mind of the dangers they connect necessarily with aviation. Stress is laid on the metal hull of the Thomas boat. Another chapter is devoted to the "Safety of the Flying Boat," in addition to a general description of the Thomas flying boat for 1914, and of the standard and Nacelle models of the land machine.

DEATH OF NAVAL FLYER.

Pensacola.—Lieutenant J. McC. Murray, of the United States naval aviation corps, stationed here, was instantly killed on Feb. 16th, when his machine plunged into Pensacola Bay. The machine was demolished, and Lieut. Murray's body was discovered shortly afterward about 100 yards from the spot where he fell.

Lieut. Murray had been flying out over the gulf and was returning to the station when the accident happened. An investigation seems to indicate that Murray "stalled" his machine. He was coming down in a succession of "steps," and at about 200 feet or less he took the final plunge from a height too low to recover.

ARMY AVIATOR BREAKS CROSS-COUNTRY MARK.

San Diego, Cal., Feb. 15.—Flying 140 miles in 133 minutes was the record made to-day by Lieut. C. Willis, U. S. A. The second record of the day was made by Theodore Maccaulay, who attained a height of 4,200 feet in nine minutes.

CHRISTOFFERSON FLIES 382 MILES.

Silas Christofferson completed at Los Angeles, on Feb. 16th, his 382-mile flight, which he started at San Francisco on Feb. 9th. A stop was made at Firebough on account of a broken propeller (140 miles from start). Then to Fresno (181 miles. His final landing was made by moonlight at Lerdo (271 miles), completing the longest one-day's cross-country flight made in America.

The following day he flew into Bakersfield (283 miles). The railroad mileage is, of course, greater than these map figures, as the first day's journey figures 306 miles by rail.

On the 11th five attempts were made to cross the Techachapi Mountains, but return was finally made to Bakersfield to make a change of engines.

On the 16th he flew into Los Angeles (382 miles). The original plan was to fly to San Diego (499 miles).

FLORIDA-NEW YORK AIR TOUR.

Tony Jannus is planning a trip from St. Petersburg up the coast to New York, starting about the first week in April. The object of the trip is to establish the Benoist airboat in the minds of the public as having made the longest over-water cruise up to that time, and to include in this cruise the longest American non-stop over water flight; this after completing 7,000 or 8,000 estimated miles over the St. Petersburg-Tampa ferry route. The machine, ready for 200 miles' non-stop flying, weighs 1,700 lbs. and will carry 400 lbs. more, the former weight including life preservers, tools, rope, paddles, fire extinguisher, water, oil, gasoline—everything in cruising equipment save camp tent, folding bath tub, portable range and steam heating system.

DEATH OF FRANK M. BELL.

"Dr." Frank M. Bell was seriously injured in an aeroplane accident near Meridian, Miss., and died as a result of his injuries.

Aero Clubs would do good work if they would investigate accidents in the endeavor to arrive at the causes. as is done by the U. S. Government and the British aero clubs.

MARTIN MAKES NEW PASSENGER RECORD.

Los Angeles, Feb. 14.—Glenn Martin started from Los Angeles with two passengers to fly to San Diego, with the intention of breaking the altitude and endurance records with two passengers.

He succeeded in all except reaching San Diego. An accident to his engine off Oceanside forced him to land. They reached an altitude of 4,000 feet and were in the air two hours, an American record.

Daytona, Fla., Feb. 5.—Mrs. Robert Goelet made a flight with Ruth Law.

San Francisco, Feb. 5.—It is reported an arrangement has been made by the Panama-Pacific Exposition with the Parseval Airship Company to operate one of their ships in passenger service during the exposition.

Dallas, Tex., Feb. 11.—J. H. Worden, a Moisant flyer, Fred DeKor, Miss Katherine Stinson and Frank Terrill flew during the National Corn Show at Dallas.

Raymond V. Morris is now with the flying boat colony at St. Petersburg. C. C. Witmer is flying McCormick's boat at Miami. Walter Johnson, after purchasing from the Thomas Bros. a flying boat of his own, is teaching pupils in Florida. Stephen MacGordon is flying Thaw's boat at Palm Beach.

NEW MOTOR FOR GALLAUDET BULLET.

A new Maximotor power plant is being put in the Gallaudet's "bullet" flying boat and trials will soon begin with this.

Man calls on the President and announces he wants to teach Mr. Wilson how to fly. The police found $1,022 in his pockets.—*N. Y. Tribune.*

Certainly, he was no aviator—not with that much money!

SPECIAL PREMIUM OFFER TO MODEL BUILDERS

A special premium offer is made to new subscribers in the model field. A complete set of materials for a model Bleriot-type monoplane, shown in the illustration with directions for construction and flying, will be given free with each new yearly subscription sent in by a model flyer. This set of parts sells alone for $3. The subscription to AERONAUTICS is $3 yearly. Readers of the model page may have both for the price of one.

This unassembled model is built by the Wading River Mfg. Co., of Wading River, N. Y., and includes complete woodwork and rattan cut to lengths, fabric for covering planes, proofing solution, wheels, ball-bearing propeller shaft, propeller blank, rubber strands, nails, wire, tubing, axle, etc., etc. This concern makes, in unassembled or assembled form, miniature aeroplanes of all the well-known types and furnishes supplies of all kinds for the building of miniature flying machines. An extensive catalogue is sent free on request.

AERONAUTICS, 122 East 25th Street, New York

A E R O · M A R T

HYDROAEROPLANE — Complete; perfect condition. Flown by Fred Eells and Wm. F. Cline for two hours at an altitude of 2,500 feet. Bargain for quick sale, $790. Will demonstrate. G. Welles, 166 S. Goodman St., Rochester, N. Y.

FOR SALE—Our last year's monoplanes and biplanes; very cheap for cash, or trade for anything of value.—F. M., 1522 Norwood Ave., Toledo, Ohio.

SACRIFICE—A Curtiss type biplane, flown by one of America's most famous aviators, with 8 cyl. Hall-Scott 60 H. P. motor, all in A1 condition, for $1,350 cash, subject to demonstration to bona-fide purchaser. Shipping boxes, propeller, crates, completely equipped for the road. Free instruction in flight to purchaser at well-known flying field. The best bargain of the season. Opportunity knocks but once at every man's door. Address "Sacrifice," care of AERONAUTICS, 122 E. 25th St., New York.

WHEN IS A FLYING BOAT A MOTOR BOAT?

The question as to whether a flying boat and a hydroaeroplane is to be considered a motor boat while navigating on the water is now before the law officers of the Department of Commerce for consideration and an opinion will shortly be rendered. This is the result of the question having been raised by AERONAUTICS (see July, 1913, number), when Commissioner E. E. Chamberlain ventured a personal opinion. The Aeronautical Society then forwarded the Department a copy of a set of rules designed to cover the matter, which had been prepared by a special committee at some previous time. If this class of flying machines comes under motor boat rules, Tony Jannus will be the first to make application for a license for the operation of the Benoist Air Line at St. Petersburg.

BOMB-DROPPING TEST AT SAN DIEGO.

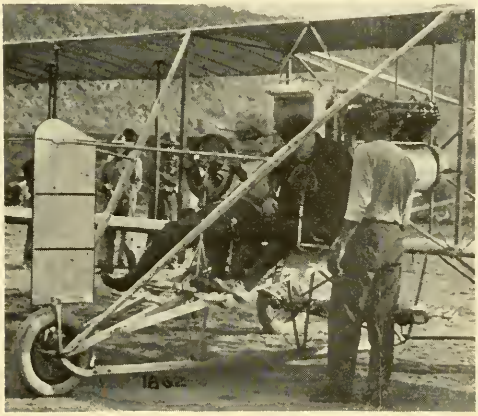
Experiments in the dropping of bombs will be made at San Diego very shortly, using the device of Riley E. Scott, who will do the operating. Aerial bombs of various weights have been manufactured at the Frankford arsenal and shipped to the Signal Corps aviation school. Plungers with varying arming ratio and non-delay primers for use in dummy bombs were made a part of this shipment. An incendiary and illuminating projectile is in course of development, but it is not known whether this will be tried out aerially.

The importance of bomb dropping from air craft is indicated by the fact that these experiments will be of a confidential nature, and the description of war material is always confidential, and it is against the policy of the War Department to print descriptions of especially designed apparatus.

Full description of the Scott device, with which he won the Michelin prize two years ago, has been printed in AERONAUTICS.

BOMB-DROPPING IN MEXICO.

Thomas J. Dean writes he is in charge of the aeroplanes for the Constitutionalists in Mexico. The illustration shows the aeroplane that was seized as contraband of war by the United States when Dean was bringing it from Los Angeles to Arizona in May, last



year. It was afterwards stolen and smuggled across the border into Mexico and was flown over Ortiz, Sonora, from the Constitutionalist lines. Bombs were dropped at the Federal gunboats in Guaymas Bay. Out of five trips over the boats one was close enough "to get four men off the boat and disabled the Tampico, putting her in the drydock for five days. The picture shows the machine ready to leave the ground for a trip over Guaymas Bay at Maylorena, Sonora. The bombs can be plainly seen under the center of the machine."

TWIN MOTORS FOR TRANS-ATLANTIC FLIGHT.

A. G. Watkins, of 27 N. Conestoga street, Philadelphia, Pa., is the inventor of a system of coupling two motors together in such a manner that either can be instantly disconnected or instantly thrown in. The two motors are placed side by side and either one or both can drive on the propeller shaft.

THE TRANSATLANTIC FLIGHT.

Editorial discussion of the Wanamaker-Curtiss transatlantic project in papers from New York to San Francisco has been very reassuring to those who feel that of late the American press has treated aviation cavalierly. With very few exceptions—notably the Boston "Transcript," whose aviation editor cannot conceive of anything practical in aviation developing west of Marblehead—editorial writers have been at some pains to base their opinions on the facts and figures given out for publication. They have given due consideration to facts and possibilities, and the result has been the almost unanimous approval of the project outlined.

Lyman J. Seely, of the Curtiss companies, says: "The few exceptions recorded seem to be based on false premises. Some assume that the distance to be flown is from 2,500 to 3,000 miles—instead of some 1,640. Or, that no reliance can be placed on any compass—despite the assurance of Garros and other distance fliers that they found the reverse to be the case. Or, that in other duration flights (around closed circuits), the average speeds have not exceeded 60 miles per hour—although it has been stated repeatedly that the flight will be attempted only with a strong following wind, backed by expert assurances that the direction and duration of this wind can be depended upon.

"As to the motor: the average runs of Curtiss O-X, 100-h.p. motors during the past year have been 3,500 to 4,000 miles without overhauling. In one case a motor with a record of more than 10,000 miles of actual flight was, after overhauling, run for 40 hours under load at flying speed without an adjustment and without missing an explosion.

"The suggestion that more than 200 h.p. is needed is refuted by duration flights recently made in Germany. February 3, Bruno Langer flew 14 hours 7 minutes. February 8, Karl Ingold flew 16 hours 20 minutes. February 12, Langer, in an effort to fly 18 hours, flew 16 hours 1 minute, when, because of loss of fuel, he was forced to descend. These flights were made with practically standard machines equipped with 100-h.p. motors.

"On the basis of past performances, the optimists seem to have a good many points on the pessimists in calculating chances on the transatlantic venture."

BOATS SUCCESSFUL ABROAD.

Another shipment of Curtiss flying boats and Curtiss motors started for Russia last week. The half-dozen flying boats and twelve O-X motors when packed for foreign shipment filled three large box cars and represented a tidy fortune. From Italy G. F. Campbell-Wood cabled a report on the successful acceptance flights of the first of the new fleet of Curtiss machines destined for that country. All of the tests for speed, weight carrying, climbing, seaworthiness, etc., were passed easily, and the machine turned over to the admiralty.

Baron D'Orcy cabled from Constantinople of an arrangement with the Turkish Porte for the early demonstration of Curtiss flying boats for that country. Curtiss flying boats now have been adopted for naval use by almost all of the European governments, including Russia, Germany, Italy, Austria, Spain, et al.

TRANSATLANTIC PILOTS.

Lieut. John H. Towers, a prospective entrant for the Wanamaker-Curtiss transatlantic flight, has telegraphed from the Navy aviation camp at Pensacola to G. H. Curtiss his intention to come North this week to discuss plans for the prospective flight. If arrangements prove satisfactory to him, he will then apply to the Secretary of the Navy for permission to participate in the attempt. Also insistent on going is John Lansing Callan, of Albany, a very experienced operator of Curtiss machines, who is now stationed at Pensacola to observe experiments on behalf of the Curtiss Company. Callan flew nearly 12,000 miles last summer, frequently making 500 miles a day for several consecutive days, despite the fact that he landed and changed passengers every 10 miles. William S. Luckey, winner of the race around Manhattan Island, is anxious to volunteer and feels confident the flight will be a success. As Lieut. Porte, the British aviator, arrives here on the Campania Saturday, it is probable the actual entrants will be finally decided upon within a week.

AERO CLUB PENNSYLVANIA

OFFICIAL BULLETIN

OFFICERS.

Clarence P. Wynne, *President.*
Jos. A. Steinmetz, *1st Vice-President.*
Wm. D. Harris, *2nd Vice-President.*
George S. Gassner, Secretary
Laurence Maresch, *Treasurer.*

DIRECTORS.

Arthur T. Atherholt.	Harold H. Knerr.
H. F. Bamberger.	Wm. H. Sheahan.
Dr. Samuel C. Falls.	Walter S. Wheeler.

Office of the Club, Bellevue-Stratford, Phila., Pa.

The Aero Club of Pennsylvania held its stated meeting at the Bellevue-Stratford Hotel, Philadelphia, on the evening of February 6, 1914.

The routine business of the meeting included the appointment of a Committee on Arrangements for the dinner to be tendered to Col. Samuel Reber, U. S. A., on Thursday evening, March 26, on which evening Col. Reber will address a joint meeting of the Franklin Institute and the Aero Club of Pennsylvania.

Arrangements were also made whereby members of this club will in the future receive free of expense to themselves regular subscriptions of "Flying" as well as AERONAUTICS, providing their dues are paid in advance.

After the business meeting a most interesting address was made by Mr. Joseph A. Steinmetz, the newly-elected vice-president, which was received with much enthusiasm by the members present. Mr. Steinmetz spoke particularly on methods of offense and defense by aeroplanes and other air-craft during time of war.

A movement is on foot for the purchase of two 30,000-ft. balloons with a view of having frequent races during the coming season. It is expected that there will be much activity in this sport in and around Philadelphia in the very near future, due to the fact that the Aero Club of America looks upon this club as a leader in that sport in the East.

PRACTICAL MEN WANT TO CALL WORLD RACE OFF.

Aeroplane constructors, aviators, private owners and others interested in bona fide progress have appealed through AERONAUTICS to the management of the Panama-Pacific Exposition to change the conditions of the proposed prize for a round-the-world race and make the offer for a flight to be accomplished in North America.

J. Guy Gilpatric considers the world race "in its present form absolutely impossible, but fear that the 'knock' to the science sure to follow the inevitable failure to succeed would cripple it for several years." Cecil Peoli subscribes to the same opinion.

It is urged that the prize money, variously figured from $150,000 to $300,000, be made available for a race between the Pacific and Atlantic Coasts. The Curtiss Aeroplane Co. suggests a flight from New York to San Francisco by way of the Panama Canal. "That would have real significance for the Exposition. Its advertising value would be greater than an around-the-world flight because the American press could observe and report the progress of the fliers each day. This would be absolutely out of the question in case anyone were foolish to start through the Arctic Circle on the proposed flight." "A race across the Siberian steppes is of about as much value for an advertising or boosting proposition as pasting circus bills inside the tent," says another manufacturer.

It is pointed out in almost every letter that AERONAUTICS is daily receiving from these practical people that very, very few entries could possibly be hoped for under the present offer, owing to the enormous expense alone; while a tour of North America, visiting the principal cities, would really attract a large number of entries, reduce the expense to competitors, interest to an enormous extent the public through the press and result in a great step forward in the popularization of flying, toward which every effort of those genuinely interested in the future of aeronautics should be bent. The time and energy now spent in making America lead in sensation would do wonders if directed along optimistically intelligent lines.

The round-the-world air race has proven thus far a great advertising scheme for the Panama-Pacific Exposition, but even the accomplishment of such a flight would have more of the attraction of novelty than the merit of utility. It would prove nothing that could not be proved with less danger and expense, and with more practical results.

THE AERONAUTICAL SOCIETY

29 WEST 39TH STREET
NEW YORK
TELEPHONE BRYANT 4600

OFFICIAL BULLETIN.

Notice to Members.

At a meeting of the directors of the Aeronautical Society, February 19, 1914. it was voted that the magazine AERONAUTICS be sent to every member *in good standing* as one of the benefits of membership and that the said journal be made the bulletin and official organ of the society.

In order that members may obtain the benefit of this arrangement, it is earnestly requested that those in arrears place themselves in good standing at the earliest possible date.

Announcements of meetings, papers presented, lecturers and other notices of the society will, until further notice, be published in AERONAUTICS, which will be mailed on the 15th and 30th of each month to members in good standing.

Next General Meeting.

The next general meeting of the society will be held in the rooms, 29 West 39th street, New York, at 8.30 o'clock, on Thursday evening, March 12, 1914.

Speakers.

S. S. JERWAN, aeroplane pilot, expert and lecturer, will address the society on THE ART OF PRACTICAL FLYING. The talk will be profusely illustrated with lantern slides. Mr. Jerwan will describe the sensation of aerial travel and give his hearers a complete course of instruction in piloting, demonstrating with stereopticon views and models.

CAPTAIN FRITZ E. UTTMARK, Principal of the New York Nautical College, will treat of TRANS-ATLANTIC AEROPLANE TRAVEL, telling how the aeroplane may be navigated by instruments, how to safeguard the journey, the dangers and ways to minimize—all from the standpoint of the mariner. In view of the proposed attempts to cross the ocean, this lecture is most timely.

Members are invited to bring their friends.

New Members.

Harold B. Anderson, Wintor Motor Co., Cleveland, Ohio.
Ethelbert Favary, 111 Broadway, New York.
F. J. Mulder, 165 East 86th street, New York.

Membership Certificates.

Engraved membership certificates, size 11 in. by 14 in., hand imprinted on Japan vellum, suitable for framing, are now prepared and will be sent to all members in good standing and to all members elected in future.

Directors' Meeting.

Notice to Directors:—Directors' meetings will be held regularly, as in the past, every Thursday evening except those on which general meetings are held.

AERONAUTICS
Combined with "FLY"

Published Semi-Monthly by Aeronautics Press
122 E. 25th St., New York
Cable: AERONAUTIC, New York
'Phones 9122 / 4413 Madison Sq.

A. V. JONES, Pres't — ERNEST L. JONES, Treas'r-Sec'y
ERNEST L. JONES, Editor — M. B. SELLERS, Technical Editor
HARRY SCHULTZ, Model Editor

SUBSCRIPTION RATES
United States, $3.00 — Foreign, $3.50

No. 80 — FEBRUARY 28, 1914 — Vol. XIV, No. 4

Entered as second-class matter September 22, 1908, at the Postoffice, New York, under the Act of March 3, 1879.

¶ AERONAUTICS is issued on the 15th and 30th of each Month. All copy must be received 6 days before date of publication. If proof is to be shown, allowance must be made for mailing.

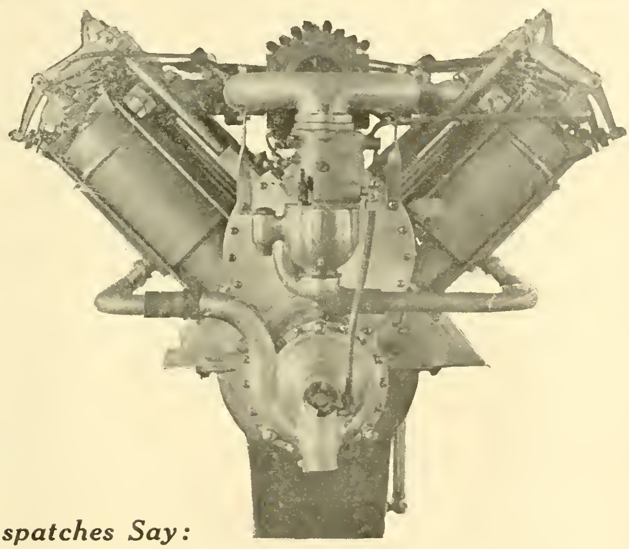
¶ Make all checks or money orders free of exchange and payable to AERONAUTICS. Do not send currency. No foreign stamps accepted.

V. No. 5 MARCH 15, 1914 15 Cents

ERONAUTICS

TH WHICH IS COMBINED FLY

Official Organ and Bulletin—Aero Club of Pennsylvania
The Aeronautical Society

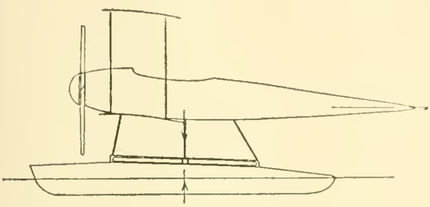


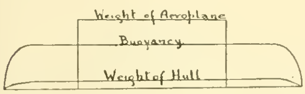

Leading aeronautical pilots the world over give preference to the
Bosch Magneto
There are nearly two million in use. Surely that is sufficient proof to convince any one that Bosch is superior; but the fact that every world's record is also a Bosch Record is conclusive evidence that Bosch merits the consideration of everyone interested in aviation.
Be Satisfied Specify Bosch
We will be glad to make magneto recommendations for your motor
Bosch Magneto Company
201 West 46th Street : New York

NOTES ON HYDRO-AEROPLANE FLOATS

It seems natural that speed boat designers should be the proper ones to design hydro-aeroplane floats and flying boat hulls, but practically all the boat builders interviewed recently by AERONAUTICS put the problem up to the aeroplane maker, and the aeroplane maker seems to agree in this.

But one of our aeroplane makers is experienced in boat building and the success achieved by the others is the more remarkable. Some notes from *British Aeronautics* on the subject of design are of interest.





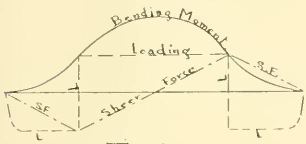


Fig. 1
Method of Obtaining Curves of Loading Sheer and Bending Moments

A boat or float of any description can be considered as a floating beam, the loading on which (if any) will be the algebraic sum of the buoyancy and weight at every transverse section, the whole being in equilibrium. In a hydro-aeroplane there need be no provision against a concentrated weight, since the weight of the aeroplane above can be spread over a large portion of the total length, and so lessen the loading, sheer forces and bending moments, especially if it is placed on a separate girder first. The curves of weight, load, sheering force and bending moment, illustrated in Fig. 1, are made as simple as possible. Then a stepped hydroplane float, when planing, will be supported approximately on points, and is therefore analogous to a girder supported on two or more points with a varying load. A brief outline of the work done in designing ordinary ships will be given, applied to the case of a simple float.

The method used is, of course, graphical integration, by dividing up the length into a large number of parts, so that all curves can be represented approximately by level straight lines. The principle involved is, of course, that the first and second integral curves of loading curve are the sheering and bending moment curves respectively. If an "integraph" can be borrowed (costing about $200) much time can be saved.

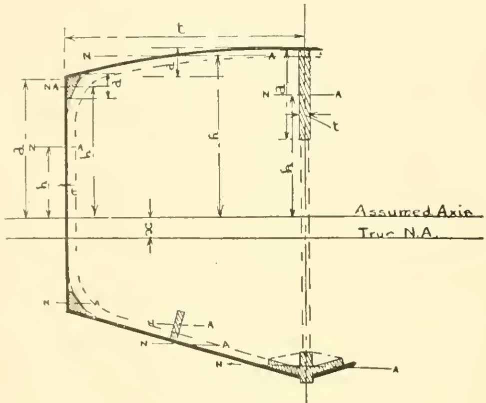


Fig 2
(d & h in inches or feet.)

When the maximum bending moment can be measured off the curve, and the position at which it occurs, we can proceed to work out the maximum tensile and compressive forces in any part. The moment of inertia of any section (such as in Fig. 2) can be easily worked out. The method is as follows: Take any line as an axis of reference, or assumed axis, anywhere, horizontal.

Then for any part vertical, the area will be $d \times t$ sq. inches, and its moment about assumed axis $= d \times t \times h$. Its M.I. (moment of inertia) about its own N.A. (neutral axis, or axis through obvious C.G.)

$$= t\,d \times \frac{d^2}{12}$$

Its M.I. about assumed axis

$$= t\,d \times \frac{d^2}{12} + t\,d\,h^2$$

Now for any horizontal flat section, moment about assumed axis $= d \times t \times h$ again, and its M.I. about its own N.A. $= t\,d \times \frac{d^2}{12}$ and M.I. about its assumed axis $= t\,d \times \frac{d^2}{12} + t\,d\,h^2$, but since d^2 (square of small quantity) is negligible, the expression becomes $t\,d\,h^2$.

Item	Area	Distance C.G. from Axis h	A h Below	A h Above	h^2	A h^2	Depth d of Part	d^2	A d^2
	Σ A		Σ A h	~ Σ A h		Σ A h^2			Σ A d^2

So proceed to fill in the table above

The M.I. about the assumed axis $= \Sigma$ A h^2 $+ \Sigma$ A d^2. Now to find the distance of the true N.A. from the assumed position,

$$x = \frac{\text{difference of Moments Area}}{\text{Area}}$$

h, d, and x being in same terms, feet or inches, etc.

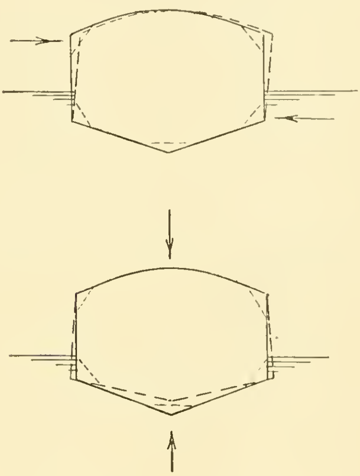


Fig. 3
-Transverse Strains due to insufficient strength in brackets.-

The true M.I. about true axis will be given by

$$\text{M.I. (assumed axis)} - \text{A } (x)^2.$$

It is now possible to find the stress in any part by the use of $P = \frac{m\ y}{I}$ as usual.

A metal construction might be found to come out lighter for strength than wood, but here the question of corrosion enters. Duralumin is said to be non-affected by sea water, so might be suitable. When considering the strength of a float one is apt to pass over the lateral construction. It is possible that the connections between the side frames and the bottom of deck beams are a source of weakness as in Fig. 3. This at any rate might be responsible for leaks round the edges. The theoretical calculation of the strength of a closed frame is rather involved and mathematical, but it is obvious that provision against this kind of distortion must be made by the use of brackets or beam knees, or by efficient bulkheads, well connected to the sides and bottom.

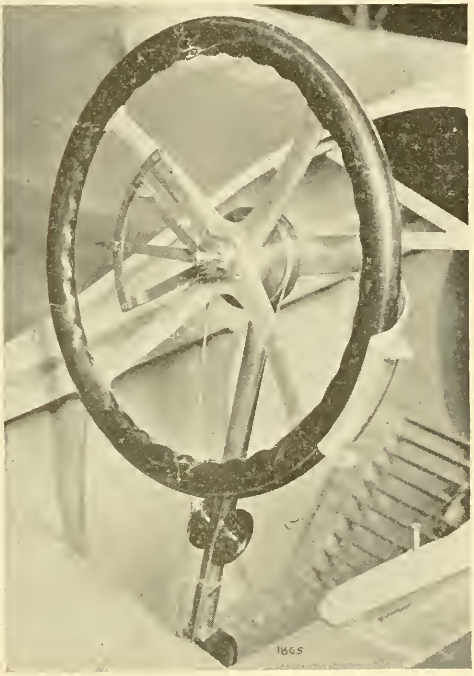
With regard to the length of floats. It seems that in the near future, at any rate, the use of "seafliers" (if one may add yet another name!) is quite impossible in a wind high enough to cause long waves. Therefore the best policy would be to adopt longer floats in order to be able to span as many long waves at once as possible, without getting into the impossible wave length phase. In other words, design the floats for a horizontal path over the wave tops. The danger begins when the machine starts to wobble over the waves.

GERMAN AIRSHIPS.

Some idea of the development of airship work in Germany may be gathered from the report recently issued by the company which runs the Zeppelin dirigible "Hansa" as a commercial proposition. This vessel has just made her three-hundredth trip, having been in commission for fifteen months. In that time she has spent 632 hours in the air and has covered 34,336 kilometres (about 21,000 miles). Exclusive of her own crew, she has carried 6,337 passengers, averaging about twenty-one passengers per trip. As the passengers pay about $25 per trip, it will be seen that the income from this source alone is fairly large. But one gathers that the greater part of the profit is made by carrying advertisements at night over Berlin and other cities, the advertisements being illuminated by searchlights carried in the cars of the dirigible. The effect of these huge signs floating apparently alone in the air after dark is exceedingly striking.—The Car.

WRIGHT WHEEL CONTROL

In the new wheel control installed in the 120-h. p. Daimler-motored tractor for the Army, the usual lever system has been replaced by an automobile type of steering wheel in combination with a handle-grip which makes the control not only stronger and simpler, but makes it much more effective. Formerly the elevator was controlled by a forward and backward movement of a lever in the left hand, while the warping and rudder were controlled by the forward and backward movement of a lever in the right hand, the rudder being offset for a turn by turning the handle of this right-

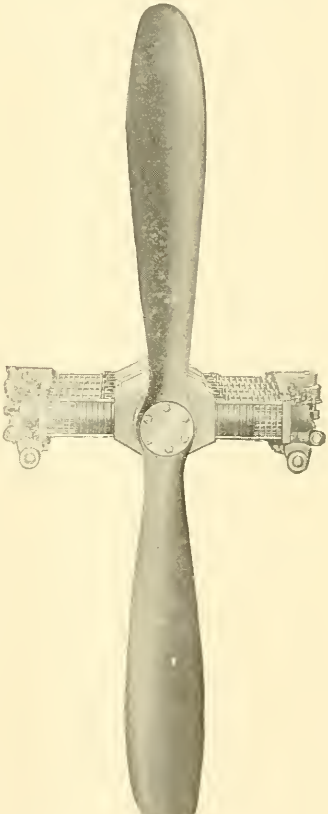


hand lever. This control, which has been used ever since 1908, was very effective for exhibition flying, for which it was particularly designed, and has proven a very precise one when once mastered. But for long distance flights, many aviators found this control tiresome, and in the new and safer machine it has become necessary to modify it into the new form.

The steering wheel is of automobile type and the control is perfectly instinctive, the wheel being pushed forward and back to control the elevation of the machine, and turned from side to side to balance it laterally. In turning the wheel from side to side, the rudder grip is turned with the wheel, thus giving a perfect lateral balance, and in turns it is only necessary to off-set the rudder handle to one side or the other, still controlling the lateral position of the machine by turning the wheel and handle together sideways.

ASHMUSEN OPPOSED ENGINE

The Ashmusen Manufacturing Company, Inc., of Kings Park, Long Island, New York, now enter the market with a new type of high-grade aeronautical engine they have developed during the past six years of study, experimenting and testing. The engines are particularly adaptable to aeronautics, and have passed through the experimental stage to the last degree. The 60 horse power engines have been tested and flown in Wright type twin-screw, Curtiss tractor-type biplane, and Bleriot type monoplane, besides hundreds of block tests have been made in summer and in winter, under all sorts of weather conditions for ten hours and more at a time under full load and full speed, and with a speed variation of less than 10 r. p. m. during the ten hours' run. The engine runs equally as well in a downpour of rain and without any cover.



There is no vibration and there is no trail of smoke nor oil behind the engine, and after a twenty or thirty hour run at full speed the cylinders are just as clean as at the start, the makers state.

The engine is of the 8 cylinder 4 cycle type, but so made that it can be set to run clock-wise or counter clock-wise, and is arranged for dual ignition (magneto and

battery), also for crank and push-button starting.

The main front bearing is such that the engine is equally adaptable for propeller or tractor type machine, or for chain drive. The crank and cam shafts run in ball bearings of liberal size that have been thoroughly tried out.

The engine is exceptionally strongly built, using over a dozen different metals, seven kinds of steel alone. The company makes and machines all parts from true gauges, fixtures, templets, jigs, etc. Any part can be accurately duplicated.

It is not necessary to remove the engine from the 'plane for examination. In twenty minutes after stopping one can have the engine apart and examine the inside and outside of the cylinders, crank-case, pistons, rings, valves, etc. In twenty minutes more one can have the complete power plant together and running again.

The engine is automatically air-cooled. On the outer surface of the cylinders are a number of flutes, disposed around, and extending about half way the length of the cylinder, connecting together at the head end, and thence to the carburetor; thus the heated air from the outer surface of the cylinders (where one does not want the excess heat), is taken and conducted through the carburetor. With this system the cylinders are kept at a good working temperature, and the heated gas makes a very economical and more positive explosion than if it were cold. This combination also permits the use of a very low grade gasoline. The engine runs on the cheapest gasoline as well as other engines do on the high-test gasoline.

The engine has no grease cups nor oil cups; just pour oil in the oil tank. The little positive force-feed oil pump, of the company's own invention, has always lubricated the engine without fail.

Every piece and part of the engine is of liberal cross-section to give the required strength and rigidity. The crank-case is one piece, a strong, stiff, box-shape casting, with heavy lugs for fastening same to 'plane. The cylinder heads are cast en-bloc and fastened with heavy through-bolts to crank-case, making the entire unit very strong and rigid.

Messrs. H. W. and C. Ashmusen are well known engineers, having done notable engineering work in the United States, France, Germany, and for the State of New York.

The company's plant is just 25 miles east of Mineola Field on Long Island, and has often been visited by fliers from Mineola in the past five years. Many of the principal aviators around Long Island have known of the work going on at Kings Park plant, but otherwise the company has been working quietly, and have only now actively entered the market with their 60 and 90 horse power engines.

They make nothing else but these engines, have made a close study of aeronautics and would be glad to have owners and makers of aeroplanes consult with them as practical engineers. They feel there is no aeronautical power problem too large for their consideration. Their regular sizes are 60 horse power and 90 horse power engines at present, but other sizes will be made to order.

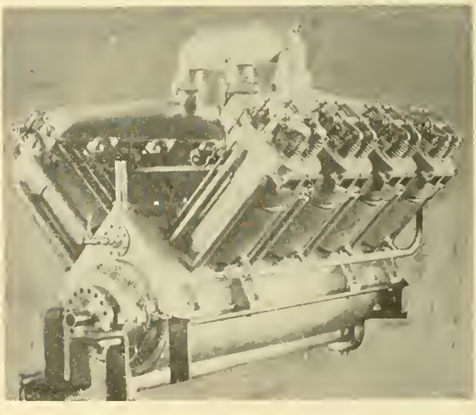
LATEST MODEL SELLERS MACHINE HAS NEGATIVE TIPS

M. B. Sellers has been flying again with his old 1909 machine, using the 8-h.p. Bates engine. The photo shows the latest modi-

fication of the machine in which, as a matter of experiment, the propeller has been placed behind on an extension shaft, a warpable rudder used (see May, 1910, AERONAUTICS), and negative tips on lower plane. These tips, on which patent is pending, incline diagonally forward and outward.

THE 200 H. P. CURTISS MOTOR

The big 200 horse power Curtiss aeronautical motor for the Rodman Wanamaker transatlantic flier has been given a five-



hour run at moderate speed, and is said to have behaved perfectly. As the motor had had but little limbering under shop

Continued on page 78

EDITORIAL

SANE PROGRESS

Probably no other art and science in history has been as prolific as aeronautics in the stimulation of vagaries of mind and flights of fancy.

Within the past year or so we have seen a diminution of the projects for wonderful air cruisers and passenger leviathans, and we have thought that the public had begun to have a better realization of the state of the art—perhaps, for the good of the industry, even *too* keen a perception. The effect of the relapse after the first flurry is known to all who have tried to continue in business the past year.

Manufacturers, dealers, aviators, experts and all the other practical men in the "aeronautical movement" have urged through AERONAUTICS a great American circuit to take the place of the ephemeral round-the-world race, on the grounds that such a circuit would insure a fair field of entrants, arouse great enthusiasm, and be of lasting benefit to the industry in this country, which would be impossible under the proposed scheme. The letters to AERONAUTICS from the eminently practical authorities are unanimous in the condemnation of the world race as opposed to the best interests of the "game."

To all sane observers there is no getting around the fact that, while a tour of the world will surely be made eventually, those enthusiasts who have so optimistically conceived this world flight in the fervor of their enthusiasm have done so without realizing the difficulties to be met with, and that they are not those who are willing to participate. One fails to see any rising up of the aero clubs and manufacturers, here or abroad, to spend all the money which will be involved. The same prize money devoted to an American tour would substantially accomplish more toward showing what Americans can do and toward the actual development of aviation than the world race.

Then there is the L'Engle bill, asking for $15,000,000 for aeronautics. This is enough to kill anything at this time, when we are begging *so* hard for the small amounts asked for by the Army and Navy. Such a bill has "no more show than a stump-tailed bull in fly time." We would not know what to do with 1,000 aeroplanes of the present type, nor could we get enough aviators for them in five years. When they want such things in France, Italy and Germany, they do it by popular subscription.

That an "optimist is an ass," sometimes, is undoubtedly true, as will be realized by those who take time to stop and think. Aeronautics needs all the support it can possibly hope for. Why handicap it with all these frivolities?

Let us be "boosters" for aeronautics, and not "knockers."

INTERSTATE AIRBOATING BOTHERLESS

A great step forward in the facilitation of interstate air travel is that just made by the Department of Commerce. As flying boats are now classed as motor boats, as far as their water navigation is concerned, it means that there are no state formalities to be gone through before crossing state borders. The owner of a flying boat can tour the United States without being in any way hampered by state laws, as long as his starts and finishes are on the water.

It now remains for the aeronautic interests of this country to obtain the passage of a Federal law covering all types of machines while in the air, and particularly the status of strictly land machines.

Already Connecticut has passed a state registration and licensing law, and other states have had local bills before their legislatures. If active work is not soon inaugurated, there will be so many state laws as to forestall any possibility of a uniform national law. The automobilists have tried for years in vain to obtain a national registration and licensing law.

Let those who are interested in advancement boost for a national law!

One big advance has been made in the matter of flying boats and hydroaeroplanes by the action of the Department of Commerce.

This idea of obtaining uniform regulations for water aeroplanes was first agitated by AERONAUTICS, and later taken up by the Aeronautical Society. The action of the Department of Commerce was entirely logical and to be expected. To obtain that much progress was comparatively easy.

The big job is to bring about a Federal law covering these machines in the air, and all other machines generally, as this must be done through action of Congress. This, also, has been urged by AERONAUTICS, and as a result a start has been made by the Aero Club of Pennsylvania in introducing a bill, which was subsequently endorsed by the Aeronautical Society.

Let the boosters rule!

WRIGHT CASE STIMULATING INVENTION

Orville and Wilbur Wright have always argued that the upholding of their patent would be highly beneficial to progress in dynamic flight, as it would stimulate the invention of stabilizing devices which would not infringe the Wright system. That this prophecy is likely to be realized is evidenced from the hasty poring over patents for ideas and for comparison and the claims being made on every side for alleged non-infringing systems.

THE DEATH OF LIEUT. MURRAY

The death of Lieutenant Murray, while flying a Burgess flying boat, is another of those charged to aviation which should have been avoided. The direct cause of death was by drowning, and under circumstances which should not have been. Had his kapok jacket floated him with his head out of water, instead of in the water, his life would have been saved, as he was but slightly stunned by his head striking something lightly. Safeguarded by a Wright incidence indicator, by a kapok jacket, and making use of the information furnished by the indicator at the moment of his death, he met his death by drowning, simply because of a life-saving jacket which did not save, or a helmet that did not protect. That this is the first serious accident had with a Burgess machine is claimed by the makers of the machine.

THE WORLD RACE

As the result of the publication in principal dailies of letters from the manufacturers and leading aviators to AERONAUTICS, the Exposition authorities have stated that as the money has already been appropriated for a world race the nature of the event can not be changed, but concessions have been made which render possible a larger entry list and seem to insure a coast-to-coast race at any rate as a part of the whole. This action on the part of the Exposition authorities is gratifying in that it makes, accomplishes, to an extent, the desired result by making the participation of American machines easier, without doing injustice to any possible foreign entries which may have already been practically made.

Concessions made by the Exposition executives are:

Time for completion of race extended to 120 days; Atlantic may be crossed by steamer and contestant penalized for each day spent on board ship; if race is not finished in 120 days prizes will be paid and contestant penalized for each additional day; route planned so that the first leg of flight will be across the U. S., thereby getting the same interest and press notices as if the flight ended in New York; provision of prizes at each control which will be raised locally and will give the flyers money as they proceed across the country.

News In General

"AEROSTABLE" GRANT NON-INFRINGING?

R. R. Grant, Associate and Electro-mechanical Consulting Engineer of Norfolk, Va., now makes public through AERONAUTICS the principal features of his machine, as patents are about to be issued in this country have already been issued in several foreign countries.

"The main feature of the machine [see drawings, photos and articles in AERONAUTICS for August, 1912, and August, 1913], which has been many times flown by an amateur who had never been in an aeroplane before—just put a green man in and started him off at 75 miles an hour—is the lateral and longitudinal stabilizing system. The machine is of the tandem type with a negative angle in the rear surface, i. e., a little less angle than the front plane, for the rear one carries the full proportion of the load. The lateral stabilizing system is based upon the law of reaction, and, both physical and mechanical in principle is different from any other ever used. The righting couple is caused laterally by a shifting action of the pressure brought on one side of the machine; it is instantly balanced off or evenly distributed on the opposite side. In other words, the head pressure is balanced off by a differential change in the angle of incidence of the entire forward plane. This change is caused by the difference in pressure on the two sides of the machine and is entirely automatic in its action. Further, the surfaces of the machine are so arranged that a perfect state of 3-point suspension is obtained; the entire machine is balanced in the air by the lifting pressure, which virtually constitutes the 3-point principle; the larger portion of the lifting surfaces being in front and one-third of the lifting surface in the rear of the centers of mass.

"The vertical arrangement of the planes is such that a perfect balancing of all the pressures acting on the machine is obtained and this, no matter in what position the machine may be placed. That is, all the atmospheric pressures, as well as the inertia pressures, converge at the center of mass of the machine. The whole question of stability lies in automatic recovery rather than any form of mechanical stability. This feature cannot be incorporated in any other than the tandem arrangement of planes. This fact Prof. Langley arrived at after tests with models for longitudinal stability. No machine can possess automatic recovery without inherent stability; there may be machines which are claimed to possess inherent stability that will not recover when falling out of control.

"Every feature has been tested thoroughly, either by intent or accident, save upside-down flying and the loop, and these the machine will not do. The machine does not fall in the side-slip, it swings around and recovers by gliding. When stalled, it settles and the shift of the centre of pressure causes it to fall by the head and glide at an angle not greater than 20 degrees; the operator, however, may increase the angle of descent at will. Many stalling tests were made, but in every instance the operator was thrown out of control—he does not know he has lost control until he has lost it and the machine is 'dead'—and the machine recovered automatically. The machine recovers with or without power on. The machine is entirely controlled by the rudder and elevator; there is no manual lateral control on the machine. A manual lateral control was employed in experiments, but found unnecessary. When the manual system is used, however, it is operated in the opposite direction from general practice.

"Comparing this machine with the Wright: to balance the Wright machine laterally the angle of incidence is reduced on the high side and increased on the low side and the rudder is turned to the high side to keep the machine from turning toward the low side; in the Grant machine the high side drops and, while the angles of incidence are altered as stated above, there is no turning tendency, as the pressures are distributed evenly over the entire surface of the machine. The righting couple is caused by a difference in efficiency of the lifting power of the planes the high side losing lift and the low side standing neutral.

"Another feature of the machine is its natural tendency to head into all winds and the rudder must be used for straight flying, performing the same functions as on a boat.

"Construction of the first machine was started in September, 1909, and the first flights were made in August, 1910, near Norfolk, Va. A speed of 80 miles an hour was obtained against a 12-mile wind. It had a 100 horse power (rated) 2-cycle engine, the machine weighed 1,400 lbs. and carried 5.5 lbs. per sq. ft. At 90 miles, which was reached on one occasion, the lift was 6.5 lbs. A 7-ft. propeller, pitch 7-ft. was turned at 1,000-1,200. The machine flew at the theoretical pitch speed of the propeller, accounted for by the position of the propeller being behind the point of greatest resistance and at the axes center of the entire machine, i. e., at the converging point of all pressures acting on the machine, which is made to come at the mass center of the machine (universal c. g.).

"No matter in what position the machine is placed whether falling, side-slipping, stalling or gliding, the pressures converge at a universal point with but one exception, that in the stalling or slowing down state the lifting pressure is shifted considerably in the rear of the center of mass of the machine, travelling forwardly, and passing the center of mass as the machine in gliding speeds above its normal flight speed on an even keel. All recoveries are finally made in the gliding state."

IMPORTS AND EXPORTS

It is sad to note the shortage of more than $39,496 in exports of domestic goods in 1913, compared with the figures for 1912. Previous to July 1, 1912, parts have not been kept track of by the Department of Commerce, so that the loss is greater than shown. Shipments during January and February of 1914, however, will help, as the Curtiss Company has made a large shipment.

EXPORTS OF DOMESTIC MACHINES

December, 1913, 1 and parts	$7,377
12 mos. ending Dec., 19 and parts	86,931
Same period, 1912	126,427

IMPORTS OF FOREIGN MAKE

December, 1913, parts only	$1,865
12 mos. ending Dec., 1 and parts	21,490
Same period, 1912, 16 and parts	62,876

EXPORTS OF FOREIGN MAKE

Dec., 1913, 1 at	$4,049
12 mos. ending Dec., 3 and parts	15,281
Same period, 1912	69,886

IN WAREHOUSES

December 31, 1913	none
December 31, 1912, 5 valued at	19,516

MARTIN TO FLY IN NEW YORK

Glenn L. Martin reports good business on the coast. A tractor has been sold to Lincoln Beachey for doing the loop and Charles Roystone is getting a Gnome-engined monoplane of the same general design as the Martin tractor. Harry C. Watts, of Chicago, has purchased a convertible tractor with Renault engine. J. H. Little, of Cleveland, has bought a flying boat and Frank A. Garbutt from Los Angeles is having a special machine equipped with a motor of his own design. A "safety pack" has been perfected, worn on the back of pilot, for 'chuting from the capsized 'plane. Glenn Martin expects to bring a flying boat to New York in the early summer.

AIR BOATS UNDER FEDERAL CONTROL

Albert Lee Thurman, solicitor for the Department of Commerce, has rendered an official opinion which places hydroaeroplanes and flying boats under the control of the Federal Government through the Steamboat Inspection Service, Bureau of Navigation, Washington, while they navigate the waters of the United States and possessions.

This settles once and for all the status of water-air craft and exempts them from any onerous restrictions which states may hereafter seek to impose through the passage of state laws, which, if they followed the present state auto laws, would be as bothersome. This opinion permits untrammeled interstate air touring as far as airboats are concerned, except where machines alight upon land.

There are no provisions in the motor boat law with which air craft cannot easily comply. Airboats with hulls less than 26 feet in length fall under Class I of Section 2 (act of June, 1910). Section 3 prescribes the kinds of lights to be carried. Section 4 requires device to produce a sound of 2 seconds' duration. Section 5 requires life belts, cushions or other, sufficient to sustain every person on board. Where passengers are carried for hire, the operator shall be licensed, but for this no examination whatever is required. This license, however, may be revoked for misconduct, negligence, recklessness, etc. Application should be made to the local board of inspectors. Section 6 provides for a fire extinguisher. Section 7 provides a penalty for violation.

The question was originally raised last year by AERONAUTICS, and Commissioner E. E. Chamberlain's unofficial opinion was published. The Aeronautical Society was recently interested in the movement and, as well as AERONAUTICS, appealed to the Department of Commerce. At the same time the St. Petersburg-Tampa Airline was communicated with, and Tony Jannus was the first one to apply for a license under the new ruling.

First among the largest motor boat organizations to recognize the importance of the flying boat as a sporting vehicle has been the Mississippi Valley Power Boat Association. This association conducts each summer the most important power boat regattas held in America. Several days are devoted to running off the events and thousands of dollars are annually offered in prizes. In session in Chicago recently the M. V. P. B. A. considered rules for the regulation of flying boat races, which they propose to schedule with other events this season. All over the country the motorboat men are beginning to recognize the advantage of a machine which, with sixty to eighty horsepower, makes faster speed than any standard motorboat, though some of these carry motors developing 400 to 1,000 horsepower, with a record for safety not comparable with that of the flying boat.

THE DISTANCE OF WANAMAKER TRACK.

An investigation made by the Government Hydrographic Office as to the distances from Newfoundland to the nearest point on the coast of Ireland results as follows:

The shortest track is from Middle Hill, Cape Freel, to Achill Head, Ireland, 1,610 nautical miles (1,854 statute miles). The sea freezes at Cape Freel and ice remains sometimes as late as June.

The next shortest is from Cape Bonavista to Achill Head, 1,611 miles nautical (1,855 statute miles).

The third and recommended track is from Cape Spear to Dunmore Head, Ireland, 1,631 nautical miles (1,878 statute). Cape Spear is close to harbor of St. Johns, where the coast has a moderate height, and the harbor is rarely frozen over for more than a week and navigation scarcely ever interrupted either by ice or fog, and supplies of every kind are always obtainable. Conditions regarding fog are given on the monthly Pilot Chart.

$50,000 CUT IN ARMY AERONAUTICS

The House Committee on Military Affairs has cut the appropriation asked by the Army for aeronautics by $50,000, leaving but $300,000 for Congress to vote upon.

$5,000,000 FOR BRITISH AIR SERVICE

The army estimates issued on March 5 show that the expenses for the year beginning April 1 are figured at one million pounds ($5,000,000) for air service.

AERONAUTICS

Combined with "FLY"

Published semi-monthly in the best interests of Aeronautics

BY

AERONAUTICS PRESS INC.
250 West 54th Street
New York
Telephone, Columbus 8721
Cable, Aeronautics, New York

ERNEST L. JONES, Editor
M. B. SELLERS, Technical Editor
HARRY SCHULTZ, Model Editor

Entered as Second Class Mail Matter, September 22, 1908, under the Act of March 3, 1879. $3.00 a year, 15 cents a Copy.

Postage free in the United States, Hawaii, the Philippines and Porto Rico. 25 Cents extra for Canada and Mexico. 50 Cents extra for all other countries.

The magazine is issued on the 15th and 30th of each month. All copy must be received 6 days before date of publication. If proof is to be shown, allowance must be made for receipt and return.

Make all checks and money orders free of exchange and payable to AERONAUTICS PRESS.

Subscribers will kindly notify this office if discontinuance is desired at the end of their subscription period, otherwise it will be assumed that their subscription is to be continued.

REMOVAL NOTICE

Attention is called to the removal of the office of AERONAUTICS back to our old address, between Broadway and 8th Avenue (opposite the Automobile Club),

250 WEST 54TH STREET

Telephone 8721 Columbus

It is not to be wondered at that inhabitants of Palestine were amazed to see Jules Vedrines fly over in an aeroplane. The last time anything like that happened was in the days of Elijah.—Birmingham *Age-Herald*.

NEW CORPORATIONS

International Flying Co., Inc., Manhattan. Build airships, etc., aerial navigation; capital, $50,000. Incorporators: H. Haoussler, A. Oberwager, B. Brinkmann, New York City.

E. H. Sassil & Co., Chicago, Ill., capital stock $25,000; manufacture and sale of multiplane airships and other mechanical devices for aerial navigation, etc.; Eugene H. Sassil, Paul Bergamini and Vincenzo Pecis.

WANAMAKER GIVES BIG BALLOON

Rodman Wanamaker has not confined his aeronautical activities to an attempt to win the Northcliffe transatlantic prize. He has placed an order with A. Leo Stevens for a balloon having a capacity of 80,000 cubic feet, to be given the Aero Club of America. It is anticipated that someone will use it in the international race this fall.

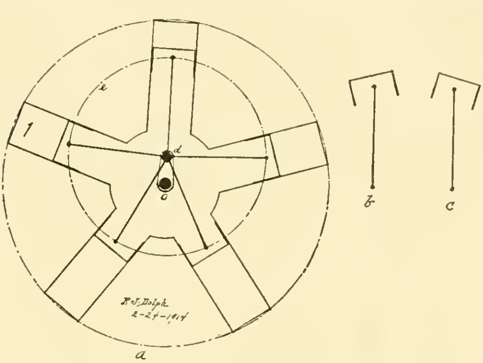
Wanamaker states that if the first transatlantic attempt is not successful, further starts will be made until the ocean is crossed, even should the first machine be a total loss. In the motor just completed, two complete oiling systems are employed, either of which may be entirely disconnected and overhauled during flight by the passenger.

MORE ON THE RECIPROCATING (?) GYRO

To the Editor:

In answer to the article in the January 15th issue of AERONAUTICS, by Ralph S. Barnaby, regarding the talk by Mr. Emile Berliner on the revolving cylinder motor, given at the meeting of the Aeronautical Society November 20th, I wish to state that I think he is wrong in assuming that the pistons of a revolving cylinder motor reciprocate the same as those of an ordinary engine.

Considering a point at the center of motion—i. e., the wrist pin of the piston, 1 in figure "a"—as being tied by a radius equal to the length of the connecting rod to the immovable center or crank pin "d," cannot do otherwise than travel the true circle "e," but it does travel at a uniform rate of speed, as do the cylinders, on account of being alternately nearer to and farther from the center "o," which causes the pistons to be alternately nearer and farther from each other during their revolution, the speed being greatest when farthest from "o," and vice versa, which causes a backward and forward thrust (with respect to direction of motion) against the cylinder walls, caused by the inertia of the piston and connecting rod due to this change of speed, and which absorbs energy during acceleration, delivering it again to the revolving cylinders in the same manner as he has explained in regard to the relation between the reciprocating piston and crank of the common type of motor.



It is true that the piston reciprocates with respect to the cylinder, or, vice versa, that the cylinder reciprocates with respect to the piston, but this is caused by the travel circles being eccentric by an amount equal to half the stroke, which is the necessary principle of the motor.

As the pistons move around an immovable center, there can be no reciprocation, as in the common type, with their movable centers; that is to say, that in very exact designing the stresses induced in the connecting rod of the ordinary motor by its own and the piston's inertia, due to reversing, do not have to be considered in the revolving cylinder type; the only things considered being the resistance of the piston against the cylinder walls, due to its change of motion with respect to same and the lateral stability of the connecting rod, due to its inertia of changing speed.

The only reciprocating motion produced in the piston is its tilting back and forth about the wrist-pin, due to the angularity of the rod, as in figures "b" and "c," but as it is balanced it has no other effect.

This article can be verified by almost anyone, from the fact that an ordinary motor can in nearly every instance be badly damaged by excessive idleing speed, caused by over-straining the connecting rod and fitting, due to inertia, but which is almost impossible in a well-designed revolving cylinder engine.

Hoping that this article can be printed in your next issue, as I would like to see as important a point as this made clear, I remain, very sincerely yours,

R. J. Dolph, Cassa, Wyoming.

I would not like to give up AERONAUTICS as it is my only reliable source of information in this line. —*R. S. B., New York.*

ARMY AVIATORS MAKE THREE NEW RECORDS

The best performances at the Signal Corps Aviation School, San Diego, Cal., this year (1914) have been: Time in air and distance, Lieut. Dodd's flight (Burgess tractor). Altitude, 12,140 feet, by Lieut. H. B. Post (Wright hydro), Feb. 9. Altitude with passenger, 8,800 feet, by Lieut. J. C. Carberry and Lieut. Taliaferro (Curtiss), on Feb. 16.

On Feb. 14, Lieut. T. F. Dodd, with a passenger (Sergeant Marcus), broke the American non-stop two-man duration and distance record. He left San Diego in a Burgess tractor, with 70 h.p. Renault engine, with Sergeant Marcus as a passenger, at 6:32 a. m. and flew north, following the coast line from La Jolla to San Mateo Point, and then crossed over to Santa Ana, following the Southern Pacific Railroad through Los Angeles to a point four miles northwest of Burbank; turned and retraced his course to the starting point, landing at 11:15 a. m. Total time in air, 4 hours and 43 minutes; total distance, 244.18 statute miles. He found the air conditions fairly good, although he encountered some very rough spots across the valleys and over the Santa Ana river; the weather cloudy, with easterly winds, between 5 and 10 miles per hour.

The following is the summary of flights from the beginning of the year to February 28: Total number of flights, 640; total time in air, 161 hours and 29 minutes; total passengers carried, 275.

For the week ending Feb. 28th, at the Army Aviation School at San Diego, the number of flights were 35; time in air, 8 hours and 52 minutes; passengers carried, 26.

REPORT ON POST ACCIDENT

Washington, D. C., Feb. 20.—The death of Lieut. H. B. Post has been ascribed to structural collapse of his army hydroaeroplane. Lieut. Post descended from an altitude of 12,140 feet to an altitude of 1,000 feet in a normal manner, and from that point to a point approximately 600 feet above the ground at an increasingly steeper angle, the machine ultimately assuming a vertical head-down position, falling into the bay. The board was unable to determine the cause or fix the responsibility for the accident, but is of the opinion that the cause was due to the machine getting into a verdical head-down position, causing excessive pressure on the planes, which resulted in the collapse of some part or parts of the machine.

THE ARMY AND THE WRIGHT PATENT

The question has been raised as to whether the U. S. Government is bound by the recent court decision in the matter of the Wright patent suit.

It appears that the Government has the right, under the broad principles of "eminent domain," to seize, appropriate, or through its officers cause to be seized or appropriated, private property when required for public use. But it is a principle that compensation must be given for such seizure to the person whose property has been appropriated. The same general principles now apply in regard to patent rights, which are personal property. Before 1910, the Government several times used patented inventions without authority, and the patentees were accustomed to sue for this infringement.

In 1910 a law was passed (36 Statutes at Large, Chap. 423, p. 851, U. S. C. Stat. Supp. 1911. p. 1457) to the effect that whenever an invention covered by a patent of the U. S. is used by the Government without license, the owner thereof may recover reasonable compensation by suit in the Court of Claims; provided, however, that the Court of Claims shall not entertain a suit or award compensation under the provisions of the act where the claim for compensation is based on the use by the U. S. of any article heretofore owned, leased, used by, or in the possession of the U. S. And provided, further, that in any such suit the U. S. shall avail itself of any and all defenses, general or special, which might be pleaded by a defendant in an action for infringement, as set forth in title 60 of the Revised Statutes, or otherwise. This was in order to further protect owners of patents.

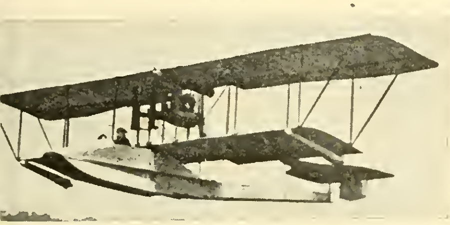
A D V E R T I S I N G   T A L K S—I.

Because a firm may be well known, or internationally heard of, is no reason that it should assume that advertising or other kind of support to the trade press is of no value.

Everybody buys National biscuits. One can't look anywhere without seeing a National biscuit ad. If this company stopped advertising, would you forget National biscuits? Yes, you would—and you would buy the biscuits of some other maker who advertised so wholesale-ly. The National biscuit is, therefore, still advertised—and so is the Ford car.

Aero Plane Maker, Esquire, thinks that Russia, or Argentine, or Italy is going to buy his aeroplane by "suggestion" or some other psychologic method.

AERONAUTICS reaches the buying foreign governments through bona fide subscriptions. It has the welcome of an authoritative pioneer. Its articles are unbiased and are highly valued. The catalogue of a maker is at once discounted, as are the statements of a representative. Your apparatus is brought to the attention of the reader of AERONAUTICS with full force and effect —and at what a saving over any other method!



The Thomas School

OF AVIATION

OFFERS SUPERIOR ADVANTAGES

Address, **Thomas Bros. Aeroplane Co.**

BATH, N. Y.

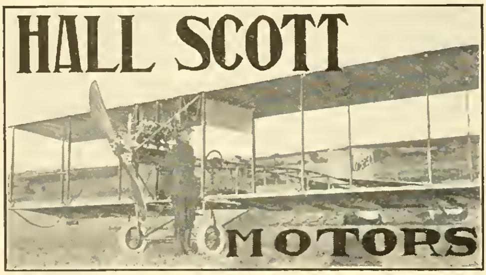
WIRE

We make an extra high grade plated finish wire for aviators' use.

FOR FURTHER INFORMATION ADDRESS

John A. Roebling's Sons Co.

TRENTON, N. J.



Longren and his HALL-SCOTT powered tractor

The Young Aviation Co., Topeka, Kansas have written

"We have used No. 51 three seasons, has done elegant work all this time, no motor failure, and have filled more dates than any other aviator in the state of Kansas and most of Oklahoma and Nebraska.

Signed A. R. LONGREN."

Investigate our 100 H. P. equipment

Hall-Scott Motors Guarantee Success

Hall-Scott Motor Car Co.

818 Crocker Bldg. San Francisco, Cal.

A E R O · M A R T

OHN WISE.—"History and Practice of Aeronau-s," by John Wise. We have just secured another y of this famous rare work. Cloth, 8vo, ill., 310 steel engraving frontispiece. For sale at $10. RONAUTICS, 250 W. 54th St., New York.

FOR SALE—Our last year's monoplanes and bi-nes; very cheap for cash, or trade for anything value.—F. M., 1522 Norwood Ave., Toledo, Ohio.

SACRIFICE—A Curtiss type biplane, flown by one of America's most famous aviators, with 8 cyl. Hall-Scott 60 H. P. motor, all in A1 condition, for $1,350 cash, subject to demonstration to bona-fide purchaser. Shipping boxes, propeller, crates, completely equipped for the road. Free instruction in flight to purchaser at well-known flying field. The best bargain of the season. Opportunity knocks but once at every man's door. Address "Sacrifice," care of AERONAUTICS, 250 West 54th St., New York.

THE AERONAUTICAL SOCIETY

29 WEST 39TH STREET
NEW YORK
TELEPHONE BRYANT 4600

OFFICIAL BULLETIN.

Notice to Members.

At a meeting of the directors of the Aeronautical Society, February 19, 1914, it was voted that the magazine AERONAUTICS be sent to every member *in good standing* as one of the benefits of membership and that the said journal be made the bulletin and official organ of the society.

In order that members may obtain the benefit of this arrangement, it is earnestly requested that those in arrears place themselves in good standing at the earliest possible date.

Announcements of meetings, papers presented, lecturers and other notices of the society will, until further notice, be published in AERONAUTICS, which will be mailed on the 15th and 30th of each month to members in good standing.

Membership Certificates.

Engraved membership certificates, size 11 in. by 14 in., hand imprinted on Japan vellum, suitable for

framing, are now prepared and will be sent to all members in good standing and to all members elected in future.

Next General Meeting.

The next general meeting of the Aeronautical Society will be held Thursday evening, April 9, in the rooms at 29 West 39th Street, at 8:30 o'clock.

Speakers.

Rudolph Hanau, of Darmstadt Technical University, will give an illustrated lecture on "Genealogy of Machine Parts," with special reference to aeronautics.

The office of the society is open from 1 to 6 every day, except Saturday and Sunday, and on every Thursday evening. General meetings with lectu are held every second Thursday, unless otherwise nounced. Directors' meetings are held on all otl Thursday evenings.

Meeting of March 12

S. S. Jerwan, Moisant pilot and lecturer, gave popular talk, illustrated with colored slides, tak his audience through a course of flight at a mo plane school. The balance of his lecture was a demic in character, as it was planned for popu consumption. It was the more appreciated by members as it showed how the general public lool at aeronautics, and was heartily enjoyed as a fresher of memories. Mr. Jerwan's lecture sho be heard in every village of the country.

R. R. Grant described his changeable angle of cidence machine, which he claims does not infri the Wright patent, and an exhaustive argument entered into by Mr. Grant and the members on aerodynamics and the physics of his system, wh was greatly enjoyed by the figure sharks. The pı cipal points of his talk will be found elsewhere this issue.

At the March 12th general meeting, Rudolph Fı was presented with a silver cup, donated by Mr. L. Herreshoff, for breaking the world's model fly record, starting from the ground. The distance 1,620 feet.

New Members.

George W. Kline, 48 West 3d Street, Waynesb Pa.; Leon Goldmerstein, E.E., M.A., 29 West 3 Street, New York; ,, 1 y Helms, 1488 Washing Avenue, New York.

AERO CLUB PENNSYLVANIA

OFFICIAL BULLETIN

OFFICERS.

CLARENCE P. WYNNE, *President.*
JOS. A. STEINMETZ, *1st Vice-President.*
WM. D. HARRIS, *2nd Vice-President.*
GEORGE S. GASSNER, Secretary
LAURENCE MARESCH, *Treasurer.*

DIRECTORS.

Arthur T. Atherholt.	Harold H. Knerr.
H. F. Bamberger.	Wm. H. Sheahan.
Dr. Samuel C. Falls.	Walter S. Wheeler.

Office of the Club, Bellevue-Stratford, Phila., Pa

The regular meeting of the club was held in Pa C of the Bellevue-Stratford, on the evening of Ma 6th. Several new members were elected, and Rodman Wanamaker was elected to honorary m bership in appreciation of his distinguished serv to aviation.

The club passed a resolution disapproving the posed Panama-Pacific Exposition race around world, but suggested instead a circuit of the Un States, touching the principal cities of the wl country. Such a race, it is believed, could be car to a successful conclusion, and would arouse imme interest and enthusiasm in every section of our la

On March 26th, Colonel Samuel Reber, U. S. will deliver a lecture before a joint meeting of Aero Club and the Franklin Institute. His sub will be "Recent Progress in Aeronautics."

A dinner will be given to Col. Reber by the A Club, on the same date. Invitations, with full ticulars, will be sent to members in a few days.

Clarence P. Wynne, Presiden

THE 200 H. P. CURTISS MOTOR

Continued from page 70

power it has been thought advisable to keep the speed below 1,100 revolutions per minute for the first few days, but even at that speed the nine and one-half foot experimental propeller shows a static thrust of more than 800 pounds.

It is of the "V" type, 8 cylinders, with a bore and stroke of 5x7 inches. Cylinders are individual, with welded water jackets of non-corrosive metal. Each cylinder has 4 tungsten steel valves, 2¼ inches in diameter, with 7-16 lift. All 32 valves are operated from a single camshaft. The cylinders are held down to crank-case by tubular studs from the heads with extension through-bolts through main bearing caps. All outside bearings are self-lubricating of the graphite inlay type.

Crank-case is composed of two aluminum castings, thoroughly bridged. The crankshaft is 4 ft. long, 2¼ inches in diameter, and is drilled with an oil duct 1 1-16 inch diameter. It is made of imported Krupp steel, formula EF60. Connecting rods a I type forgings with large bearings and ducts to piston pins.

Water circulation is by large centrifu pump with double outlets and a capac of 40 gallons per minute. Cylinder hea and valve seats are water cooled, and haust valve stems are water cooled almost their entire length.

Three rotary gear pumps take care of t lubricating system. One large pump driv the oil under high pressure to every beari through the main shaft, cam shaft and co necting rods; while two smaller pumps ke the lower half of the case drained. splash system is employed, the idea bei to eliminate the waste of oil and dang of flooding cylinders should the machi assume an unusual angle.

Gasoline intake manifolds are 2½ incl in diameter and 2½ inch Schebler carbu tor is used. Intake manifolds are wa jacketed. Ignition at present is by 2-spa Bosch magneto, but this may be replac later by two single-spark Bosch instrume of the half-speed induction type.

THE FLORIDA AIR LINE

On February 28 the St. Petersburg-Tampa airboat line finished its second month of operation.

In the possible 50 days of operation, as the contract precluded Sunday work, there were only 7½ days lost; 4½ in the month of January and 3 in the month of February. Weather has ceased to be a great factor in the operation of an airboat. During this period only three days were lost on a count of weather; the other 4 were because of mechanical trouble.

There were made in all 172 regular trips, or 43 straight days of operation out of 50 possible days. Besides that, there were made more than 100 special trips, ranging from 10 minutes' duration to an hour each. Out of these 172 regular trips, consisting of 21 miles each way, the time on 161 of them did not vary more than a few minutes, as the usual time ranged from 19 to 23 minutes. On the regular work in these 43 days, 3,612 miles were covered, besides the special work noted above.

McCAULEY MAKES HIGH MARK

On February 25, at San Diego, the Curtiss school instructor, Theodore McCauley, ascended to a height of 12,139 feet in a flight of 53 minutes, making a new one-man altitude record. The old record was 11,639 feet.

February 14.—Lieut. J. C. Carberry flies the Army Curtiss from San Diego to Del Mar and return, a trip of 60 miles.

February 15.—Lieut. C. Willis flies in an Army Curtiss 140 miles in 133 minutes, cross country, from North Island to San Juan Capistrano, the major part of the trip being made over the ocean.

February 16.—Lieut. Carberry makes an Army altitude record, with a passenger, of 8,700 feet, in a Curtiss.

February 23.—William Blakely, with a 60 Hall-Scott machine, flies 78 miles in 71 minutes, from San Francisco to Cloverdale. On the return trip, on February 26, a forced descent from 6,000 feet was necessary over the waters of San Francisco Bay. Blakely jumped clear of the machine before it struck, swam around and climbed on the machine till rescued. The aeroplane was found to be but little damaged. He was 1 hour 20 minutes on the return.

February 20.—Glenn Martin, with Frank Garl as passenger, flies his tractor in a heavy wind fi Oceanside to North Island, near San Diego, a dista of 38 miles, in 1 hour 25 minutes.

February 25.—Martin flies with Garbutt back fi San Diego to Los Angeles in 1 hour 55 minutes, 117 miles.

The flying game in San Francisco and vicinity se to be improving rapidly, and no doubt before next y this will be the center of aviation in the Uni States, if not in the world. At the present tim believe we have more competent professional aviat entered in this city than in any other in the worl L. S. Scott.

A race from San Francisco to Bakersfield, ab 283 miles, is scheduled for April 21, returning April 26. The start will be from the Exposit Grounds at San Francisco. The prizes amount $2,000, divided $1,200, $500 and $300. The contr calls for at least six contestants to fly these miles for $2,000.

The Aero Club of America has awarded its me to Capt. H. E. Honeywell, winner of second place the last international race. The medal will be p sented to Honeywell at the annual dinner of Aero Club of America to be held in New York C March 19. The merit medal is presented in recog tion of Honeywell's efforts in recent balloon conte

---

CHRISTOFFERSON FINISHES LON FLIGHT

The flight started at San Francisco on Februar was completed when he flew into San Diego on F ruary 17. His trip from 'Frisco to Los Angeles mentioned in the previous issue. On February 17 left Los Angeles and arrived at San Diego the sa day, a distance of 117 miles, making 499 miles the entire trip.

I am a constant reader of your journal, which, the way, can be praised by only one word, and t is "excellent." It is truly excellent, and I assure that without AERONAUTICS on my table I ne feel as if I had the complete news. A. E. L., Pa

The New Benoist Flying Boat in Action

BENOIST

ANNOUNCEMENT

The Benoist School of Aviation now open at St. Petersburg, Florida. The school is under the personal supervision of Tom W. Benoist and Tony Jannus.

We also conduct the first regular schedule passenger-carrying air line in the world, St. Petersburg to Tampa, Fla.

Students who want to join the school and prospective agents who want their territory for the exclusive sale of our flying boats will do well to address

BENOIST AIR CRAFT COMPANY

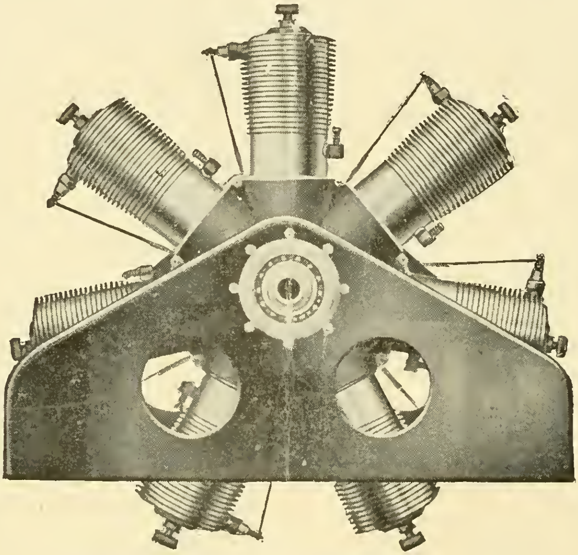
St. Louis, Missouri or St. Petersburg, Florida

---

50 H.P.
160 POUNDS

GYRO MOTOR

80 H.P.
207 POUNDS



Built of Nickel Steel and Vanadium Steel Throughout

Endurance Flying Record to Date, 4 hrs., 23 min.

From

"FLIGHT"

July 26th, 1913

"Some may say—to the obvious benefit of the Company whose representatives have adopted his very practical method of calling attention to the GYRO engine (50 h. p.) that it is *all due to the motor*, which probably develops about three times as much power as the machine requires for the purposes of straightforward flight."

Send for Catalog

THE GYRO MOTOR COMPANY, 774 Girard Street, Washington, D. C.

"REMARKABLE PROPELLERS"

Are those which are able to show results anywhere near to the ordinary performance of two- and three-bladed **PARAGONS.** The making of constant change, refinement and improvement is a feature of all **PARAGON** designing, but here are a few figures for the year 1913 :

Report of Curtiss Aeroplane Co., February 8, 1913.

Curtiss 8′ dia. x 5′ pitch—Revolutions 1225—Flying speed 54.5 miles per hour.
Paragon 8′ dia. x 5′ pitch—Revolutions **1244**—Flying speed **56.5** miles per hour.
Weight of Machine 1335 lbs. Load carried 565 lbs. Total weight 1900 lbs.

Report of Gerald Hanley, Providence, R. I. (Curtiss Flying Boat) October 13, 1913.

Curtiss Two-blade, 8′ dia.—Rev. 1250, Thrust 480 lbs.—Rev. 1300, Thrust 505 lbs.
Paragon Three-blade, 7½′ dia.—Rev. 1250, Thrust **570** lbs.—Rev. 1300, Thrust **580** lbs.

Lieut. J. H. Towers reports to the Secretary of the Navy as follows:

"The three-bladed PARAGON gives more thrust and more speed than any propeller we have had."

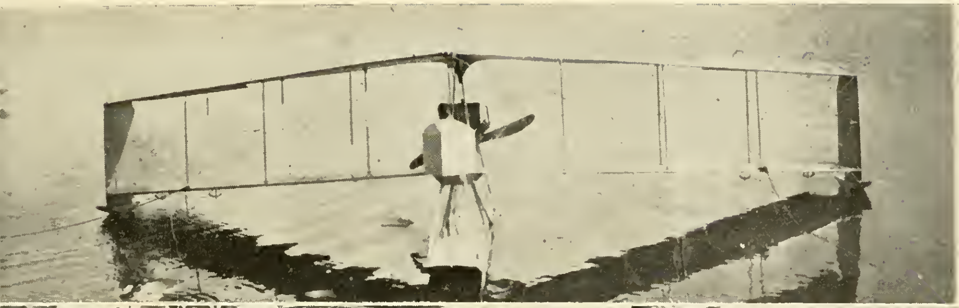
THE AMERICAN PROPELLER CO., 243-249 E. Hamburg St., Batimore, Md.

V. No. 6 MARCH 31, 1914 15 Cents.

AERONAUTICS

WITH WHICH IS COMBINED FLY

Official Organ and Bulletin—Aero Club of Pennsylvania
The Aeronautical Society



THE BURGESS-DUNNE HYDROAEROPLANE

The Burgess - Dunne hydroaeroplane, unched the latter part of February and ice flying almost continually at Marble-ad Harbor, represents the first adaptation this type of aeroplane to marine flying. ie many authorities, and this included the ventor of the aeroplane, considered that e substitution of a hydroplane (having ore or less flat bottom and deck) for the ieel gear would seriously affect the in-rent stability of the machine. It was erefore after only a very careful study the principles involved and a most ex-usting tabulation of weights, head resist-ce, center of gravity and center of pres-res at different angles that Mr. Burgess ought forth the design of his first Dunne droplane.

One can hardly imagine the enthusiasm, llowed by the first launching, when it was und that the machine balanced perfectly the water as well as in the air. When e realizes that in this type there is not right angle, that every part of the ma-ine apparently is diagonal, where the ngs formed of spiral shape are set onto e fuselage swung backward, and at a dihe-al angle, one begins to realize the task not only finding but establishing the nter of gravity and the center of pressure definite points, one of the peculiar re-irements of the Dunne type is that the nter of thrust shall pass absolutely through the longitudinal center of gravity.

A general design of the hydroaeroplane is given on an adjoining page. The principal dimensions are as follows:

Length, 24 ft. 8 in.; width, 47 ft.; height, 11 ft.; total area of sustaining surface, 482 sq. ft.; length of hydroplane, 17 ft. 8 in. 5 water-tight bulkheads; beam, 31 ft.; Depth, 15 inches; Motor, Curtiss Model OX, 100-h. p.; propeller, 8 ft., two-bladed; total weight ready to fly, 1,450 pounds.

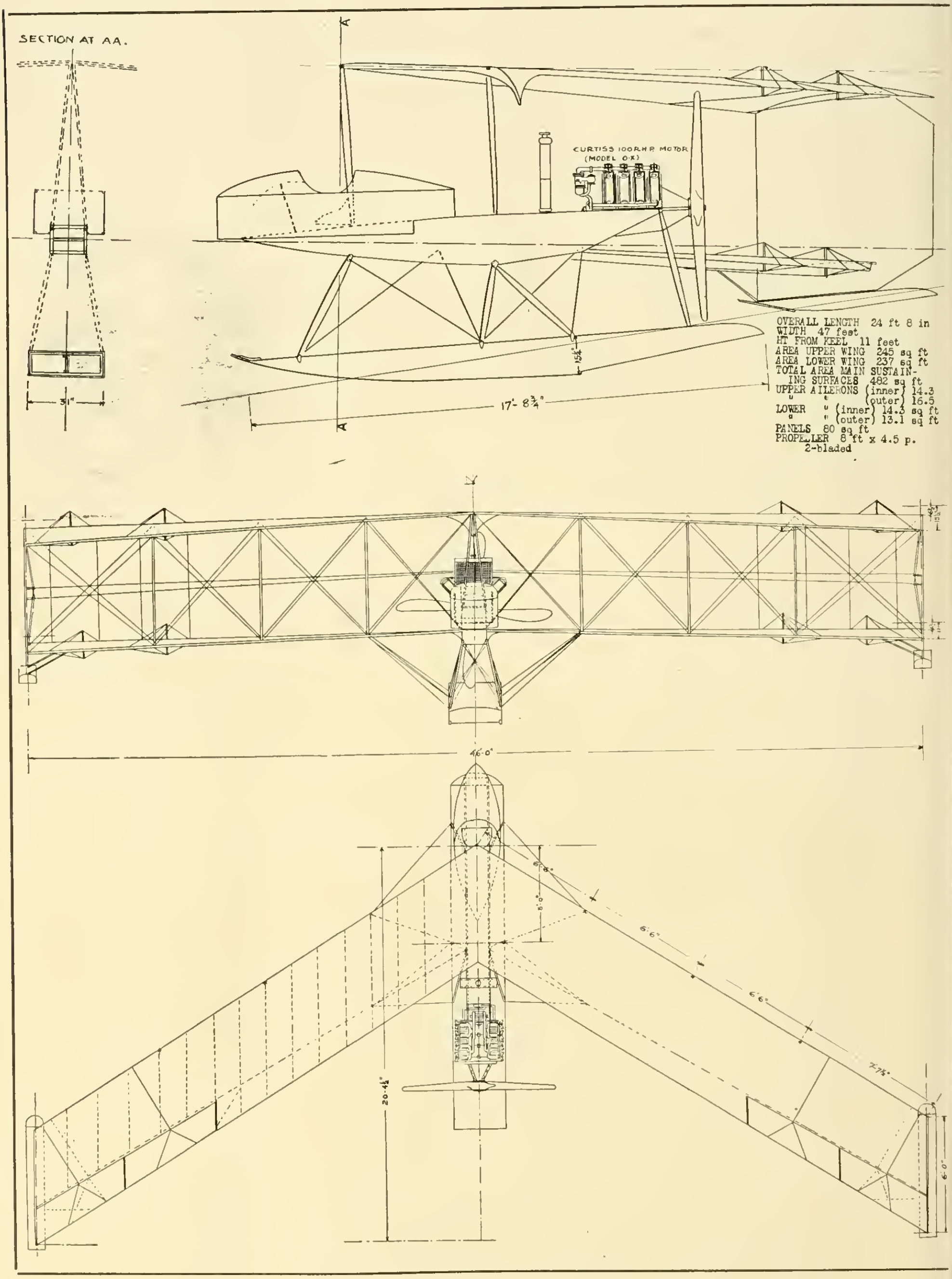
Late in February Mr. Burgess made a few jumps with the machine but the weather prevented extended flights until the first week in March, when Clifford L. Webster took the machine out and made an extended flight with it the second time he was in it.

There were many surprises awaiting those interested in the success of the new type. First, notwithstanding its increased weight on account of the substantial hydroplane required—flying weight 1,700 lbs.—the machine was found to rise easily from the water and fly at the normal angle of the older type machines. Much has been said of the inefficiency of the surfaces and the large angle said to be required in the foreign Dunnes. A careful elimination of head resistance of all parts, and a very delicate adjustment of the wings, seem to have overcome this difficulty entirely. The machine rises from the water easily, glides with the power shut off at a moderate angle and

lands, according to Mr. Webster, even easier than the old slow Wright type. Speed developed is about 55 miles per hour.

The controlling levers of the elevators are equipped with an automatic lock which enables them to be set at any point desired where they will remain until the operator wishes to change his angle or his direction.

On Mr. Webster's fourth flight he removed his hands from the controls and allowed the machine to fly itself. There was a puffy wind of about 12 miles velocity. The machine maintained its lateral and fore and aft balance perfectly. A careful observer would have noticed a slight oscillation in each case immediately overcome by the reaction set up in the various points of the supporting surfaces.



The Burgess-Dunne Hydro

TECHNICAL TALKS—by M. B. Sellers

Aeroplane Efficiency—Relation of Speed to Horsepower

Efficiency, from "efficere" to accomplish, eans the capability of accomplishing useful ork; and more especially, it means the eco- ›mical conversion of energy or power into ;eful work.

In rating efficiency we may, where possible, nploy a standard of comparison, or we may nply compare one machine with another, and is in this sense that I here use the term.

I am considering the efficiency of an aero- ane as a whole, comparing its weight and eed with its horsepower; and especially with view to classifying aeroplanes in an efficiency mpetition.

In such a competition aeroplanes would dif- r in weight, speed and horsepower and, to termine the winner, we must establish a lation between these properties.

It will be near enough to the truth to assume at, other things equal, the horsepower will ry as the weight; that is, two aeroplanes of e same speed will be equally efficient if they rry the same weight per horsepower.

Suppose, however, that one weighs 30 pounds r h. p. and flies 40 m. p. h.; and the other ighs 20 lbs. per h. p. and flies 50 m. p. h.: nich is more efficient? Our problem may be ated thus: supposing two aeroplanes equally icient, but of different speeds and horse- powers, what common relation will exist between speed and horsepower?

Assume, therefore, that the weight, design and lift ratio are constant but that the h. p. and wing area vary. As we are not now considering propeller efficiency, we shall let P = power delivered by the propeller; T = thrust; V = speed; then P = TV; let D = drift of wings and R = resistance of rest of machine; then T = D + R; let W = weight of machine, and E = the lift-drift ratio of wings; A = the equivalent normal area of head resistance and k = the normal resistance coefficient.

Then $D = \frac{W}{E}$; $R = kAV^2$ and $T = kAV^2 + \frac{W}{E}$. $P = TV$; $P = kAV^3 + \frac{W}{E}V$. That is, the power to drive the head resistance will vary as V^3 and that to drive the wings as V.

We do not need to know the values of kA and $\frac{W}{E}$ but to obtain a relation between power and speed we must assure a *ratio* between kA and $\frac{W}{E}$ so that $nkA = \frac{W}{E}$ and as this ratio differs for different machines, fixing its value will require deliberation.

Using metric units I find that n = 1000 to be a good trial value which gives n = about 5000 for English units. If $nkA = \frac{W}{E}$, then P will vary as $\frac{V^3}{n} + V$— the relation sought.

(To be continued.)

THE FALLACY OF PENDULUM STABILIZERS

That "the many proposals which have ›en made to use pendulums or gyroscopes act directly on the correcting mechanism e bound to fail" is the opinion of H. R. A. allock, F. R. S., given in a lecture before e Institution of Civil Engineers, in Eng- nd.

His opinion ultimately may or may not found of more value than that of the ientist, who said that dynamic flight was ›solutely impossible under Nature's laws, it it is of interest at the moment.

He goes on to say: "It is essential to e success of any automatic control that e forces called into play to make the cor- ctions of trim should not react on the rector of those forces, whether this is a ndulum or gyroscope or any other equiv- ent device. The only instance in which is has been fulfilled is the steady platform the late Mr. Beauchamp Tower. There ay be other methods of attaining the same ›ject in the case of wing-trimming or con- ol for flying machines, but any device in hich the correcting force tends to alter the position of the corrector is more likely to do harm than good."

The "corrector" may be understood to mean the pendulum; and if the pendulum is directly connected to the ailerons the air pressure on them will react on the pendulum and keep it from being always plumb; whereas if the pendulum acted indirect, say, through a servo motor, this would not occur.

Mr. Mallory mentions the deleterious effect of a pendulum when making a landing, when the speed is retarded by friction with the ground or by increasing the flying angle. In devices thus far experimented with, means have been provided for making the automatic system inoperative when starting or landing.

While a pendulum started swinging will swing back and forth until it comes to rest, and while, theoretically—as explained in the Wright automatic stability patent—the pendulum would cause oscillations of the aeroplane as a result, in practice it is claimed by Mr. Wright that this oscillation has been not of moment and has finally been overcome.

Walter Johnson has recently purchased a Thomas flying boat and is training students in Florida.

THE STEERING OF AEROPLANES BY AILERONS ALONE.

It will be remembered that one of the most important features of the Wright machine was the co-ordination of the warping and rudder controls, so that both lifts and drags were equalized on the two sides of the machine when turning. Pilots have differed as to the advisability of mechanically connecting the two controls, but all have had the necessity of correlating them brought strongly to their notice. Under these circumstances any method of control which obviates the use of a vertical rudder is of great importance. Whether any such arrangement is amenable to the Wright claims is a matter for jurists.

The present writer submitted a document to the Advisory Committee for Aeronautics early in 1910, dealing with various steering problems, and in this mention was made of the mechanical possibility of steering with ailerons alone. This notion has been floating about for some time. Lieut. Dunne used it in his first inherently stable biplane, and the question has again been raised by a recent writer in the *Scientific American Supplement* (April 5, 1913).

With the ordinary three-rudder system, the ailerons are used to correct disturbances of lateral equilibrium when running straight, to produce banking when about to turn, and when turning to prevent increase of bank due to the difference of the wing velocities. They cannot, however, as ordinarily employed suffice when turning, since owing to the difference in the wing velocities the drag on the outer one is more than that on the inner. To compensate for this the rudder has to be deviated in the same manner as when steering a ship. An analysis of the mechanical conditions is given in the author's article on "Steering and Warping" in AERONAUTICS, March, 1912.

If, however, the inner aileron be raised more than the outer one is depressed, the necessary drag on that side can be obtained. The adjustment must, however, be very precise or the lifts will become unequal and the angle of bank will change. Doubtless, experience would enable the pilot to estimate the motion required, just as at present he has to learn the right amount of veer needed by the vertical rudder.

Certain structural advantages occur with this method of control. It is no longer necessary to arrange the elevator and vertical rudder in a complex fashion to avoid fouling, and probably balanced elevators could be attached in a more satisfactory manner than has hitherto been possible.

Similar control could, of course, be obtained with unequal warps, but the structural difficulties are considerable. The natural analogies, of course, suggest such an arrangement. A machine whose wings can be independently warped and having no vertical rudder resembles more closely a flying animal than any aeroplane yet built. Evidently the controls would need to be capable of interconnection or not at will, i. e., the ailerons or warping would be equilibrated or not, according as mere lateral balance or steering is the object to be attained.—*By Prof. Herbert Chantley B.Sc., M.I.C.E.I., A.F.Ae.S., in British Aeronautics.*

HANDICAPPING AEROPLANES.

With the revived or increased interest in flying in this country it is to be hoped we may have some handicap races this year.

For obtaining the "dope" on the various machines, preliminary flights may be called for over a specified course with and against the wind to obtain a mean speed and the difference in the times between one machine and another can be allowed in the handicap races, provided that the time made by the same machine in an actual race does not differ from the test speed by more than per cent. Any greater difference is presumptive evidence of faking in the preliminary. By setting this percentage of variance the results then depend upon skilful flying, condition of engine, etc., and make the contests real tests of fitness of man and machine.

A method used recently in France may be of interest. The time of the handicap is obtained by the differences in the theoretical speed and is obtained for each machine by the following formula:

$$T = 20\,A\,\sqrt{\frac{Q}{N}} \text{ for monoplanes.}$$

and $T = 21\,A\,\sqrt{\frac{Q}{N}}$ for biplanes.

T equals the theoretical duration of the flight; A is the distance to be traveled; Q is the useful load (pilot, passenger, ballast, fuel, etc.); N power of the motor in H.P. which is worked out by the formula cited above.

"There is this objection to this system. A 50 h.p. machine might be tested in a . mile wind, then T is to be found, o.k. Suppose the machine is capable of 45 m.p.h. in still air and during race meets a 45-mile wind, T is then infinity because the machine would never return to starting point. The same difficulties are found in races with motor boats under same rules where there is a variation in the rate of the tide."

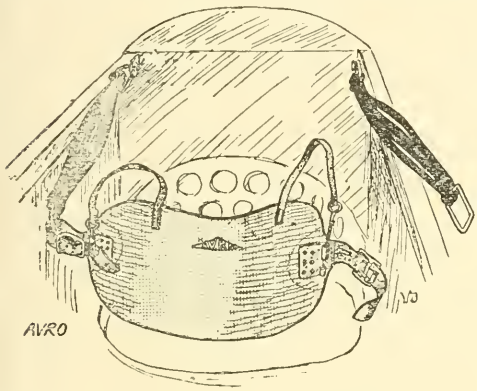
At the Hendon contests machines are handicapped on the basis of past performances and there seems to be no trouble at all.

AERONAUTICS is interesting and valuable to me. I want to show my appreciation of what you have made the magazine and do my small part in furthering what I believe to be the coming means of rapid transit and the coming sport. You turn out a ——l of a good magazine, and I want you to keep it going for the good of all of us.

W., Pa.

AVRO SAFETY BELT.

In addition to producing Avro biplanes, hydroaeroplanes, propellers and numerous accessories for aerial work, A. V. Roe & Co., Ltd., of Manchester, are making a very efficient safety-belt for aviators. One special feature is that the central portion, which is made of strong leather, is very deep, so that, in the case of a sudden shock, the belt is less likely to cause injury than would a narrow belt. Attached to this central part of the belt are two adjustable straps, which are connected to two elastic members by being looped through a ring and secured by a cotter-pin as shown. The other end of the elastic strands are attached

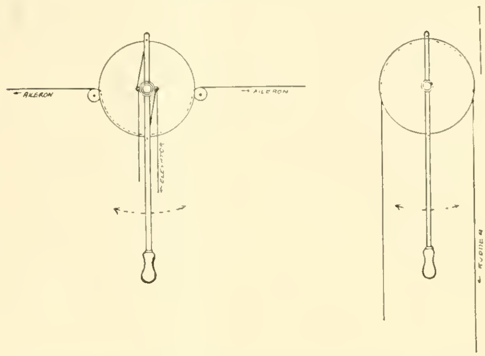


to some convenient part of the aeroplane. The little cotter-pins are attached by small straps to the belt, and all that is necessary for the aviator to do when he requires to release himself is to pull either the one or the other of the straps and so withdraw the respective pin, thus disconnecting the belt from the elastic cables. As previously mentioned, the loop-straps are adjustable, so that the belt can be made to suit varying requirements. A rather good point about this device consists of the fact that, as the aviator has to get into the belt by the use of the release arrangement, he also knows that it is in order. Furthermore, the belt can be released on either the left-hand or right-hand side. It sells for $10.

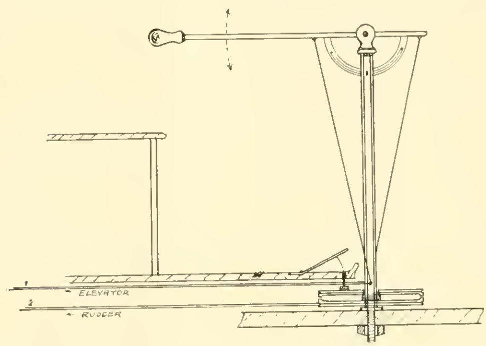
KAMP'S AUTOMATIC STABILITY.

Walter V. Kamp offers the suggestion that ailerons and flexible wing tips be allowed to do their own stabilizing work, after experimenting with models and kites. His idea is to let the two ailerons be interconnected by one cable which runs only over half the circumference of a large pulley, and let the increased pressure of the air on one act as the force to decrease that one's angle and increase the angle of the other.

He also has devised the universal control illustrated. Tilting the normally horizontal lever up or down actuates the elevator, swinging it from side to side turns the vertical rudder, while the aileron or warping cables may be engaged and operated simultaneously with the rudder by pressure of



the foot on a pedal which presses the pulley around which the aileron cables run into frictional contact with the rudder pulley.



The aileron pulley is normally kept disengaged by a coil spring. All this is clearly shown in the sketch.

ADVERTISING TALKS II.

Some 66 aeroplanes of domestic manufacture were exported during the last 22 months, which probably sold for, without including duty, more than $330,000.

Were any of these sold by catalogue? How many were sold by representatives of American makers? Were any of these sold except through our aeronautical magazines, at least indirectly, to be most modest Some of these were sold *directly* as the result of an advertisement in AERONAUTICS. Others were so frequently described and commented upon that attention of foreign buyers was demanded. It is not unlikely that AERONAUTICS can claim credit for some share of this result when it is considered that this magazine is known all over the world as the pioneer organ in America and accepted as the one official journal of the industry here.

Everything is in the point of view—the aviator who seems to us to be flying upside down looks quite normal to the people of Mars.—*Evening Sun.*

The Journal of the U. S. Artillery indexes but two American air magazines, and AERONAUTICS usually has the preference in point of articles indexed.

News In General

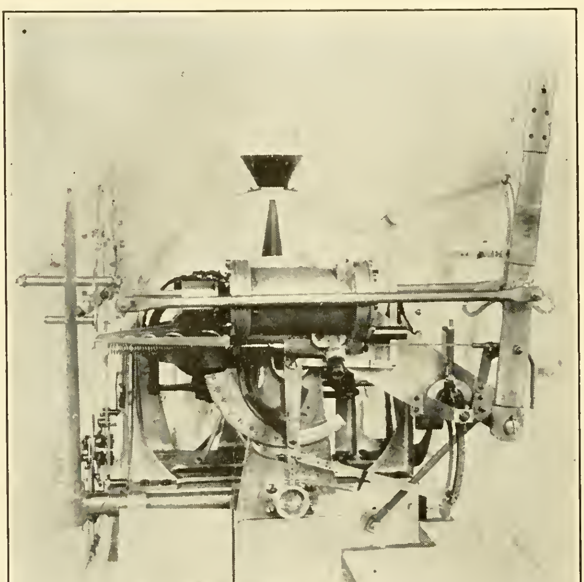
M. V. P. B. A. TO HAVE FLYING BOAT RACE.

At the convention of the Mississippi Valley Power Boat Association in Chicago, March 6, the Association adopted two flying boat classes and restrictions and arrangements have been placed in charge of the committee, Com. James A. Pugh and J. W. Sackrider. The first regatta of the season will be held at Peoria July 2-4 and the first flying boat contest will be held then. For blanks address Secretary M. A. Hoag, 517 Fulton St., Peoria, Ill.

The M. V. P. B. A. is the largest similar organization in the country and the first to recognize the flying boat. The Association already has assurance from the leading builders of flying boats that they will be represented.

SPERRY GYRO STABILIZER.

Lawrence B. Sperry is still in Paris equipping a Curtiss flying boat with the gyroscopic stabilizer, of which details were published in the February 14 issue. As soon as the Contest Committee of the safety prize competiion appoints a date a demonstration will be given, probably on the Seine. The illustration shows the latest device which has been installed.



AIR TOURING MAPS.

The National Association of Engine & Boat Mfrs. is working with the idea in view of co-operating with the Government through the United States Coast and Geodetic Survey, in the preparation for the motor boating and flying boating public, of special charts and courses that are to be somewhat similar in design and issue, to the road maps used by automobilists.

ST. LOUIS TO HAVE NATIONAL RACE.

Due to the efforts of A. B. Lambert and Robert Nolker, president of the St. Louis Aero Club, who guarantees the prize, the National elimination balloon race will be held from Priesters Park, St. Louis, July 4, 1914, with $2,500 in prizes, besides the honor of contesting for the third place on the international team. Upson and Honeywell have been appointed for two of the teams in recognition of good work abroad.

It is also expected to hold a balloon race in Portland, Ore., June 11 to 14, in which $3,000 cash prizes are offered. Mr. Jos. M. Rieg of that city has just left for home, with six entries in his pocket. All are anxious to start from that point, as it offers best oil gas and a low altitude. Some world records may be looked for.

The Oakland (Cal.) Chamber of Commerce was out with a bid of $3,500 for the National balloon race. This offer was made through the Pacific Aero Club of San Francisco. Guy T. Slaughter, president. The Dallas (Tex.) Chamber of Commerce would have been a hot competitor for the race, but poor quality of gas put her out of the running.

Geo. M. Myers, president of the Kansas City Aero Club, is making great preparations to entertain and pull off one of the largest races, by far, ever held in this country, on October 6. Fourteen entrants are assured with cash prizes amounting to $7,200, of Kansas City's fall week of festivities. The international ballon race will be the main feature.

TECH BUILDS AERODYNAMIC LABORATORY.

The first structure that the Massachusetts Institute of Technology has caused to be erected for its own uses on its site in Cambridge is the new aerodynamic laboratory. The building is finished and the apparatus is in process of installation. This together with the fact that Technology has already instituted courses in the study of this science makes i the first college in the land to be fitted to prepare students for wha must in the future be an exceedingly imporant line of development

The equipment first installed is the four-foot wind tunnel with its accompanying blower. This is of the pattern now in use at the National Physical Laboratory at Teddington, England.

Aeronautics comes under the department of Naval Architecture and Lieutenant Jerome C. Hunsaker has been detailed in charge of the instruction.

ARMY FLYING.

The flying records of officers o the S. C. A. S., San Diego, Cal., fo the week ending March 7, 1914, are as follows: Number flights, 37; time in air, 10 hours, 27 minutes; passengers carried, 29.

Summary, January 1, to March 7 1914: Number flights, 693; time in air, 175 hours, 32 minutes; passengers carried, 318.

For the week ending March 14 1914, the total number of flight were 30; total time in the air, 8 hours, 31 minutes; passengers carried, 21.

Summary, January 1, March 14 1914—Total number of flights, 723 total time in air, 184 hours. 3 minutes; passengers carried, 339.

TASCHENBUCH DER LUFTFLOTTEN mit besonderer Berücksichtigung der Kriegs-Luftflotten I. Jahrgang 1914. Mit teilweise Benützung amtlicher Quellen, herausgegeben von F. Rasch, Generalsekretär des deutschen Luftfahrer Verbandes, und W. Hormel, Kapitänleutnant a. 1). Mit 545 Bildern und Skizzen. München, J. F. Lehmann's Verlag. Preis gebunden M 5.

Lists all the dirigibles and aeroplanes of the world with photos and scale drawings, directory of manufacturers, clubs, motor builders—complete compendium of world trade data.

INSURANCE AND AVIATION.

By a recent decision of the Appellate Division of the Supreme Court (Jan. 1914), in the case of A. N. Ridgely vs. Aetna Life Insurance Co., a person engaging in the business of flying an aeroplane after having taken out accident policy as a financial writer, for instance, is not in a position to recover for disability the same amounts as he would had he not engaged in aviation. Mr. Ridgely took out a policy of $30,000 with the above company, stating his occupation as financial writer and subscribing to a statement that he did not contemplate any hazardous undertaking. At the time he had had an aeroplane constructed and a month after the policy was issued he essayed to make a test flight in the absence of his aviator Russell, though he claimed in court he had no intention of trying the machine himself when he went to the field.

The defendant company claimed that its "Classification Manual for Accident Insurance," of which the Court states the plaintiff had constructive knowledge, lists an aeronaut (sic), navigator, owner, experimenter and inventor as an extra hazardous risk and sets the limit of the risk at $500. As accident insurance carries $5 weekly indemnity for each $1,000 for total disability, and $2.50 weekly for partial disability, the Court figures that with $500 limit of risk the weekly indemnity for partial disability would be $1.25 and at this rate the Court allowed the plaintiff $38.57. Three judges concurred and one dissented.

Aeronauts, etc., as above, are listed in the Manual as non-insurable.

Another policy was held by the plaintiff with the Standard Accident Insurance Co. for $15,000 and this company paid up on the usual basis without question, the plaintiff states.

The point which is not decided in this case at all is whether flying aeroplanes or ascending in balloons and airships may be considered as recreation when such is not indulged in as a business or for experimentation.

The personal opinion of Vice-President Walter C. Faxon of the Aetna company is that flying is not recreation. It surely is when one can buy tickets in New York from one of the big steamship lines for a trip in an airship in Germany. Many tourists take this trip and certainly such travel can be called nothing else than recreation. Many prominent men all over the world take flight with aviators to enjoy the novelty of the experience and surely that is recreation and these cases should not come under the $500 risk limit.

While the application made to the Standard company had the answer "No" to the question "Have you in contemplation any * * hazardous undertaking?" this company states it "has built up a large business by not only being just to its policy holders but in cases of doubt leaning to the side of generosity. Briefly we paid Mr. Ridgely $750 rather than contest his claim."

All accident policies of all companies now have stamped on their contracts the following: "It is hereby understood and agreed that Policy No..... does not cover any bodily injury, fatal or non-fatal, sustained by the insured while or in consequence of participating in aeronautics."

WHAT DOES NOT INFRINGE.

The adjudication of the Wright patent has centered discussion on what devices do not infringe and how to avoid infringement. It is the opinion of one enthusiast who has entered into some of the discussions that more effort should be spent on inherent longitudinal stability rather than so much on lateral stability as this is a minor factor and not so important as fore and aft stability.

It is strongly contended that any aeroplane in which lateral stability is secured through depressing the high side and leaving the low side alone seemingly does not infringe. "In such a machine, where only the aileron on the high side is operated there is little tendency to turn and this tendency is necessary for the stabilization of the machine. If the rudder should be turned it would only operate to prevent stabilizing the machine and it would in such case be turned to the low side, which is opposite to the direction claimed in the Wright patent.

It is also alleged "that any Curtiss type machine can in a few minutes be changed so as not to infringe—by merely wiring the ailerons so that they can be pulled up only to depress the high side, swinging free in the streamline under normal conditions." The remarks above would apply as regards the operation of the rudder in this instance.

In answer to the question as to whether machines of the type 1, 2 and 3 infringe, an eminent patent attorney states: "The answer is yes. Claim 3 of the Wright patent would be infringed by either of these machines, as that claim has been sustained and construed by Judge Hazel and the Court of Appeals for the second circuit."

The questions were: (1) A machine in which ailerons control stability without the use of rudder. (2) A machine having ailerons but no rudder. (3) A machine having warping planes but no rudder.

Cecil Peoli, who has owned Captain Baldwin's Red Devil for the last two years, has sailed for Venezuela for an exhibition tour. Peoli will fly a plane of his own design and expects to be gone until July 1.

Mayor Blankenburg of Philadelphia on May 1 will rechristen Dr. Thomas Edwin Eldridge's balloon, recently purchased from Leo Stevens. Its new name will be Greater Philadelphia.

The 80 h.p. Gyro-motored Wright is creating a sensation at Hendon.

SOME NEW RECORDS

World's Passenger Altitude Record—Flying the 160-h.p. Paul Schmitt bipane with wings of variable incidence, Garaix reached a height of 5,700 feet with six passengers, on January 31, at Chartres.

Feb. 3 JOHANNISTHAL (Germany) *World's Duration Record*—Leaving here at 8 a. m. on a Pfeil biplane with 100-h.p. Mercedes engine, B. Langer kept in the air until 10.15 p. m. It has been stated that the pilot passed the time away by reading.

Feb. 4 CHARTRES—*World's Passenger Height Record*—Flying the same machine as he used for his previous records, Garaix rose to an altitude of 7,550 feet with five passengers on board, thereby beating the record previously established by Sablatnig.

Feb. 6—CHARTRES—*World's Passenger Height Record*—Garaix again beat one of these records on the same machine by rising to 9,000 feet with four passengers on board.

Feb. 7—MULHAUSEN (Germany)—*World's Duration Record*—Flying an Aviatik biplane fitted with a 100-h.p. Mercedes, the German pilot Ingold kept in the air for 16 hours 20 minutes without alighting, shortly before midnight. Of petrol and oil there were carried 132 and 6½ gallons respectively.

Feb. 11—JOHANNISTHAL—*World's Passenger Height Record*—The records established in France continue to fall before those made in Germany. Thelen, flying an Albatros biplane, ascended to 9,350 feet with four passengers on board.

JOHANNISTHAL—Another remarkable duration flight was made by Langer, who was attempting to regain the record from Ingold. Owing to shortage of petrol, however, he was obliged to alight after 16 hours of flying, thus failing his end by only 20 minutes. The landing was made before midnight near Posen.

Mar. 20—JOHANNISTHAL (Germany)—*World's Passenger Height Record*—The altitude record of 12,-303 feet for an aeroplane flight with three passengers was established here by Robert Thelen. The previous record was held by the French aviator Garaix, who, on March 2, attained an altitude of 10,890 feet at Chartres, France.

March 24—JOHANNISTHAL—*World Two-Man Height Record*—Linnekogel, a German aviator, to-day established a world's altitude record for a flight with one passenger in an aeroplane by attaining a height of 18,050 feet in his monoplane.

The previous record for a flight with one passenger was made by the late Edmond Perreyon, a Frenchman, who, on June 3, 1913, rose to a height of 16,270 feet.

C. Ingold, who established a new world's record for cross-country flight and stayed in the air sixteen hours and twenty minutes without landing, flew an Aviatik-Pfeil biplane, powered with a Mercedes motor which was "Bosch-Equipped, of course."

THE TRANS-ATLANTIC FLIGHT.

To the Editor of AERONAUTICS:

The writer believes that the trans-Atlantic flight for which Lord Northcliffe offers $50,000 is accomplishable with some of the present-day aeroplanes, with some changes and additions, and that this flight will be accomplished this year; also, that the round-the-world trip for which the Panama-Pacific Exposition directors offer a total of $300,000 in prizes, can and will be attained next year if certain advanced principles of aviation making for efficiency and safety are carried out; for it requires an average flight of only 200 miles per day to cover the distance of, let us say, 18,000 miles in the 90 days allowed; and some of the minor prizes for partial success are surely worth while also.

In regard to the trans-Atlantic flight, the futility of attempting it with enormous, unwieldy, untried aeroplanes, as some propose, should be apparent. But suppose we take one of the most efficient of the present aeroplanes in regard to useful weight-carrying per horsepower and miles covered per gallon of gasoline. It should have two propellers of large diameter and slow speed of revolution, besides variable angle of incidence and blades inclined slightly forwards for further efficiency, the increased amount of undisturbed air acted on in the flaring slip-stream of such a propeller more than compensating for the small loss from the slight angle of the thrust, as demontrated with the celebrated Garuda propeller of Europe. The propellers should, of course, revolve balancedly in opposite directions by means of a single chain (as can be easily arranged). Then let us add another engine and another set of such propellers, locating the latter above and below center, with clutches for shifting either engine to either set of propellers. Then, on either side of the lateral set of propellers already mentioned, let us provide two more such propellers, with half-size, direct-connected engines for each propeller and a toggle-jointed, slip-jointed, bevel-geared shaft connecting them for keeping these outer lateral propellers in unison, the advantage being that only any temporary difference in the power of the two engines would be transferred to the other and hence very little power lost in transmission. Then, for greater weight-carrying, instead of making the planes laterally wider and hence harder—and practically impossible—to brace and strengthen properly, I would add two more planes, making the machine a quadriplane, but back-stepping these extra planes instead of superposing them, thus securing nearly monoplane lift efficiency; for M. Eiffel's experiments (described in "AERONAUTICS," April, 1913, p. 132, by M. B. Sellers) show that the upper plane of an exactly superposed biplane has one-half more lift than the lower one ("the upper plane behaved as if alone, while the lower plane showed a lift one-third less"), evidently because of the upper plane throwing air down onto the top side of the lower plane, the suction on the one side of a plane or propeller (revolving plane) being a negligible disturbance as compared with the push given the air on the opposite side of the aeroplane or propeller (as is proved by holding one's hand alternately in front and in rear of a revolving propeller or electric fan); and, coinciding with these facts, A. Tcherschersky, of the Imperial Polytechnic, St. Petersburg, has found that a back-stepped (completely back-staggered) biplane gives 15 to 20 per cent. more lift than a superposed one and 30 to 40 per cent. more lift than one staggered in the ordinary way, besides better longitudinal stability. (See London "Aeronautics," July, Sept. and Nov., 1913.)

Therefore these two extra planes should be located, one completely in front and as far below the lower plane as the width fore and aft, and the other plane completely in rear and as far above as this depth; so that these two added planes would each yield monoplane efficiency, or the same as Eiffel found for the upper plane of a superposed biplane. Thus, with these six propellers and four planes, the aeroplane's lifting capacity would be practically tripled and the speed increased about 25 per cent., with the angle of incidence remaining the same and the head resistance doubled for the same speed but increased probably 50 per cent. more at the increase speed.

The machine should, of course, be a hydroaeroplane, and for safety there should be lateral resistance surfaces co-operating with the rear vertical rudder for steering, but no fixed horizontal-rudder surface; while an automatic balancing device—instantly suspendable, however—might be added to relieve the aviator when tired.

The writer is convinced that a safe aeroplane of more than twice the present greatest efficiency will be made; in fact, aerodynamical experiments already made show that this is possible to-day, and it seems more than probable that such a machine will win the prize for the round-the-world flight next year. In a subsequent communication the writer may give his conception of this coming flying machine—having concluded to give to the world all my ideas on aviation instead of patenting them, hoping thus to aid aviation's advance. These ideas relate to inherent and automatic stability devices, coping with so-called "air-holes," more efficient parachutes, multiplanes, helicopters, vertical and hovering flight, speed variation, reciprocating and feathering propellers, greater efficiency of planes, propellers and controls, upper-side air-rarifaction, suggestions for aerodynamic research, learning Nature's secrets of flight, etc.

Yours very truly,

ELMER G. STILL.

AERO SCIENCE BULLETIN I.

The Aero Science Club has been organized by college and other students to foster aeronautics among the young men and boys. The dues are $3 a year. Each member receives the magazine AERONAUTICS for a year and an engraved membership certificate. In AERONAUTICS will be published each issue, semi-monthly, a bulletin announcing the titles of essays and lectures delivered at the various branches of the A. S. C., with the names of new branches, officers, etc., as they are organized throughout the country. The most important papers will appear in full with discussions. Each year interbranch or co-operative conferences are planned to be held at the various colleges and schools.

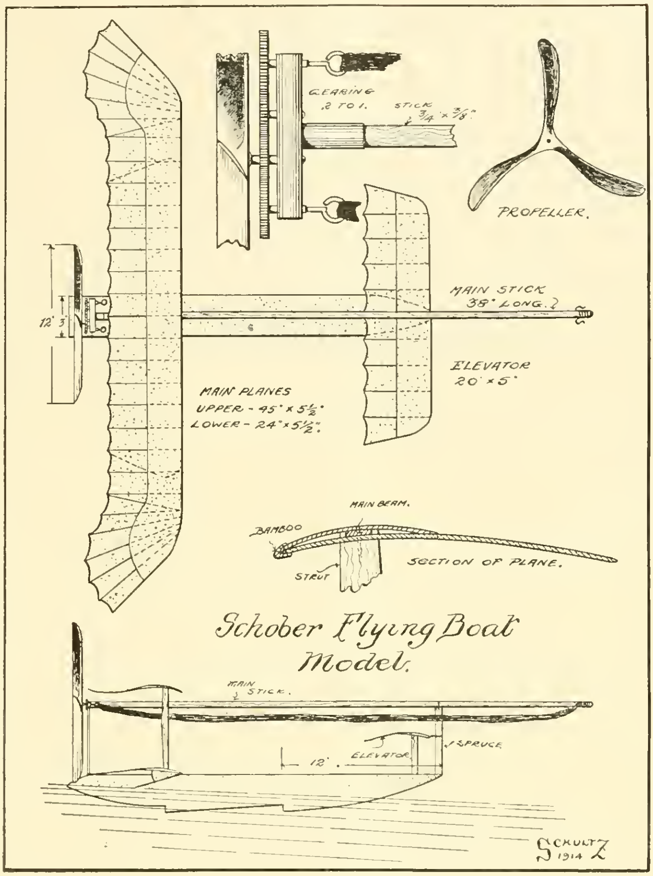
Five or more persons in a vicinity may organize a branch of the Aero Science Club and each branch will elect its own officers.

For every five additional members the Director will donate a sterling silver medal to be competed for as the officers of that branch may direct. Prizes for the best design of club pin, flag, membership certificate, etc., will be offered by the Director. Members of all branches in the vicinity of Greater New York are invited to take part in contests to be held at Van Cortlandt park for the greatest distance flown during 1914 for a model aeroplane starting from the ground. This yearly trophy has been donated by F. L. Herreshoff—a silver cup—and contests are held every Saturday afternoon, weather permitting.

For further particulars, address Edward Durant, Director, Room 827, World Building, New York.

THE SCHOBER FLYING BOAT MODEL

By HARRY SCHULTZ, Model Editor



The flying boat model shown in the accompanying drawing was constructed by Mr. Frank Schober, of Brooklyn, N. Y., and is the first successful model of this type in America, as far as can be ascertained, and possibly in the world. It is of very excellent construction throughout, as are all of Mr. Schober's models, and when tested out some time ago this model arose from the water and flew several hundred feet on its first effort.

The boat or hull of the model, 28" in length, is built up of ⅛" spruce. It has two steps, each ¾" high, the front step being 12" from the bow of the boat and the rear step 9" from the front step. The boat is 3" wide and 3" deep at its deepest part, just at the front step. It is covered with silk and then made absolutely waterproof with Ambroid varnish. The boat weighs 2½ ounces and has a buoyancy of 6 pounds.

The planes are of the shape and dimensions shown and are built up of bamboo and spruce, the main wing bar being of ½" by 5/32" spruce and the ribs, which are double, are of bamboo. The upper ribs extend half-way back on the plane and both ribs, the upper and lower, come together at the entering edge of the plane, and are glued in a slot in the bamboo strip which forms the entering edge of the plane. The construction is clearly shown in the detail sketch. The covering is of silk and is first glued on the under side of the planes and then brought over the top and glued thereon, the covering ending at the center of the plane at the ends of the upper ribs. The planes resemble those on the Caudron machines and are beautiful specimens of workmanship. The two main planes are connected by four struts of spruce 6" long, ⅛" thick and ½" wide, cut to streamline form. Two of the struts are placed at the extreme ends of the lower plane, the remaining two at the center ¾" apart. The struts are secured to the planes by slotting their ends, the slots fitting around the main beam in each plane and secured thereto by means of a small brad and glue. (See detail sketch.) The lower main plane rests on the boat and the elevator is pivoted to an upright strut at the front of the boat as shown.

About 1¼" below the upper main plane and secured to the two center struts and also supported by two pieces of umbrella rib extending up from the rear of the float is the motor stick which is of balsa wood 38" in length and ¾" by ⅜" in thickness, rounded off to a streamline form. Extending up from the front of the boat is a spruce strut which is secured to the motor stick by an aluminum clip. Secured to the rear end of the motor stick, behind the main planes is a gearing with a two to one ratio upon which is mounted the three-bladed propeller.

The propeller is 12" in diameter and has a pitch of 12". It is cut from white pine, the three blades being each cut separately and the three mortised together at the hub. The joint at the hub is done in such an ingenious manner that it is scarcely perceptible.

The gearing is driven by two motors of 15 strands each of ⅛" flat rubber.

MODEL CLUB NOTES.

The first semi-annual meet and exhibit of the Kansas City Model Aero Club was held at Swope Park on the afternoon of Saturday, February 14th, with surprising and excellent results.

For models rising from the ground, three prizes were offered, two cups and one medal. These three prizes were all won by Mr. Arthur S. Johnson whose model was a Bleriot type furnished by the Wading River Mfg. Co., with a flight of 632 feet. This is quite a wonderful feat for a model of this type.

In the contest for hand launched models there were eighteen entrants, four of which were girls, three of the girls winning prizes.

The results as follows: First, Miss Mildred Perlin, 1,296 feet; second, Arthur S. Johnson, 962 feet; third, Miss Alice Boyce, 832 feet; fourth, Miss Eula Thompson, 803 feet. Special prize for duration, Ferdinand Bolo, 42 seconds.

Excellent flying was done by the members of the St. Louis Model Aero Club at a contest held a few weeks ago. The contest for hand launched models was won with a flight of 2,100 feet and the R. O. G. contest was won with a flight of 725 feet starting against the wind and curving with it. The weather was very inclement and many models were smashed. The club is fast improving both as to members and results. Many of the members are working along scientific lines. One of the members has a marvelously light two-cylinder steam engine which he intends to place in a model he is building for it. The engine itself weighs four ounces, but the boiler brings the weight up to much more. The president of the club Mr. Waldo G. Clegg is the possessor of a propeller testing machine with which he is collecting some interesting data in regard to model propellers, also the number of turns permissible with different numbers of strands and different length motors.

WARNENDE STIMMEN IN BEZUG AUF ZEPPELIN BALLOONS, by Victor Silberer. 16mo., paper, 34 pp., published by L. W. Seidel & Sohn, Vienna, Austria.

THE AERONAUTICAL SOCIETY

29 WEST 39TH STREET
NEW YORK
TELEPHONE BRYANT 4600

OFFICIAL BULLETIN.

Notice to Members.

At a meeting of the directors of the Aeronautical Society, February 19, 1914, it was voted that the magazine AERONAUTICS be sent to every member *in good standing* as one of the benefits of membership and that the said journal be made the bulletin and official organ of the society.

In order that members may obtain the benefit of this arrangement, it is earnestly requested that those in arrears place themselves in good standing at the earliest possible date.

Announcements of meetings, papers presented, lecturers and other notices of the society will, until further notice, be published in AERONAUTICS, which will be mailed on the 15th and 30th of each month to members in good standing.

Membership Certificates.

Engraved membership certificates, size 11 in. by 14 in., hand imprinted on Japan vellum, suitable for framing, are now prepared and will be sent to all members in good standing and to all members elected in future.

The first twenty-five impressions of the new membership certificate will be auctioned off at the general meeting of April 9.

Next General Meeting.

The next general meeting of the Aeronautical Society will be held Thursday evening, April 9, in the rooms at 29 West 39th Street, at 8:30 o'clock.

Speakers.

RUDOLPH HANAU, of Darmstadt Technical University, will give an illustrated lecture on "GENEALOGY OF MACHINE PARTS," with special reference to aeronautics.

GEORGE CLISTON, of the firm of Herbert & Huesgen, will discuss AERIAL PHOTOGRAPHY, the photographing of aircraft from the ground and the ground from aircraft, with practical demonstrations and exhibits of the proper apparatus and products.

New Members.

Rudolph R. Grant, Box 254, Norfolk, Va.

Subsequent Meetings.

Future general meetings will be held May 14 and June 11. At the May 14 meeting the evening will be principally devoted to late developments in aeronautics as portrayed by lantern pictures of new aircraft and accessories, with a popular series of pictures of general aeronautic interest.

AERO CLUB PENNSYLVANIA

OFFICIAL BULLETIN

OFFICERS.

CLARENCE P. WYNNE, *President.*
JOS. A. STEINMETZ, *1st Vice-President.*
WM. D. HARRIS, *2nd Vice-President.*
GEORGE S. GASSNER, Secretary
LAURENCE MARESCH, *Treasurer.*

DIRECTORS.

Arthur T. Atherholt. Harold H. Knerr.
H. F. Bamberger. Wm. H. Sheahan.
Dr. Samuel C. Falls. Walter S. Wheeler.

Office of the Club, Bellevue-Stratford, Phila., Pa.

On March 26 Colonel Samuel Reber, U. S. A., delivered an address on "Recent Progress in Military Aeronautics" at a joint meeting of the Aero Club of Pennsylvania and Franklin Institute.

TO DETECT SIDE DRIFT.

Jos. E. Bissell suggests a device to detect side drift of helicopter in which he hangs a pendulum to the upright of the helicopter. An indicating needle is attached to the upper end of the pendulum so as to show against a circular scale graduated in 10 mile marks at either side. The idea is in starting, level, the pilot may steer west. If the machine is blown a hundred miles off to either side the gyroscope will cant over at an angle which would be indicated on the scale as the pendulum always hangs plumb.

NEW CORPORATIONS.

Batson Air Navigation Co., Savannah, Ga., $250,000. M. A. Batson, president.

The Western Canadian Aviation Co., Ltd. (Winnipeg), promoters and exploiters of aviation for commercial, recreative and other purposes; capital stock, $10,000, divided into 100 shares of $100 each. Incorporators: Frederick F. R. Minchin, William V. Miles, Charles S. A. Rogers, George O. Hughes and James A. Hesketh

---

On March 6 wireless messages were sent and received between Roy Knabenshue's dirigible and the station at San Pedro, 40 miles distant.

During the flight Roy Knabenshue was at the pilot wheel, Hayes operated the wireless and L. Armstrong, assistant pilot; E. Hilson, assistant to Hayes. H. May, Joseph J. Heit and F. A. Scott were the other passengers.

The Curtiss Aeroplane Company has been granted judgment by default yesterday in its suit against R. C. St. Henry, the aviator, for $335 due on a note given to Glenn H. Curtiss for cash advanced in 1911, and $957.74 for goods and merchandise bought from the Curtiss Exhibition Company, both with interest.

The Wright Aeroplane owned by C. P. Rogers was sold at a constable sale on March 9 at Barnesville, O. Mrs. Rogers and aviator Wiggins brought the machine there last fall during the fall races and were scheduled for two flights, but during the first one the machine fell, wrecking it and slightly injuring Wiggins. By the time it was rebuilt the repairmen feared to allow the machine to be risked in flight.

Lincoln Beachey is being sued for $100,000 damages for alleged failure to fly a contract made with a Japanese promoter, who claims he must commit hara kari because of Beachey's attitude.

"Jack" Vilas and W. S. Bestas are among those reported to be figuring on the trans-Atlantic trip.

Haldemann von Figyelnessy, a Curtiss pilot, intends to fly 3,000 feet high, tumble out of his machine and fall gently to earth with Leo Stevens' safety parachute pack. The parachute is now carried in a drawer at any convenient part of his aeroplane. The drawer automatically releases the parachute when he is ready to tumble. The aeroplane will be smashed, of course, but the moving picture people will reimburse him if the feat is successful.

The A. C. of Ilinois has appointed a cup challenger committee to consider providing a machine and pilot for the international 'plane race.

C. C. Witmer, with Miss Margaret White and a mechanic, flew after the SS. Miami on March 24, landed Miss White on board the ship and delivered mail after ascertaining the ship's position by wireless of 30 miles out from Miami, Fla.

AERONAUTICS

Combined with "FLY"

Published semi-monthly in the best interests of Aeronautics

BY

AERONAUTICS PRESS INC.
250 West 54th Street
New York
Telephone, Columbus 8721
Cable, Aeronautics, New York

ERNEST L. JONES, Editor
M. B. SELLERS, Technical Editor
HARRY SCHULTZ, Model Editor
C. A. BEIER, Advertising

Entered as Second Class Mail Matter, September 22, 1908, under the Act of March 3, 1879. $3.00 a year, 15 cents a Copy.

Postage free in the United States, Hawaii, the Philippines and Porto Rico. 25 Cents extra for Canada and Mexico. 50 Cents extra for all other countries.

The magazine is issued on the 15th and 30th of each month. All copy must be received 6 days before date of publication. If proof is to be shown, allowance must be made for receipt and return.

Make all checks and money orders free of exchange and payable to AERONAUTICS PRESS.

Subscribers will kindly notify this office if discontinuance is desired at the end of their subscription period, otherwise it will be assumed that their subscription is to be continued.

THE AERONAUTICAL SOCIETY BULLETIN

PHOSPHORESCENT AIRCRAFT AND LANDING STAGES.

Lecture Before The Aeronautical Society, February 13, 1914.

By William J. Hammer.

At the general meeting of The Aeronautical Society, held February 13, 1914, Mr. William J. Hammer, consulting electrical engineer and vice-president of the Society, gave the first public demonstration of the method invented and patented by him for producing brilliant colored phosphorescent materials and demonstrated before an enthusiastic audience the possibilities of the application of these materials in connection with aerial navigation.

Mr. Hammer showed a variety of objects covered with his luminous materials, which were in some cases, applied in the form of paint; and in other cases the materials were embodied with clay, enamel and other substances, including some specimens containing a trace of radium. All these objects glowed most beautifully in the dark after exposure to a Cooper-Hewitt mercury arc lamp, which Mr. Hammer stated he had found most useful as a stimulating agent, though he says there are various other means which might be employed. Naturally sunlight forms a most efficient and economical method of stimulation and with certain materials the "phosphorescent glow" lasts for hours but at times it will be necessary during the night to periodically re-stimulate the surfaces by means of the mercury arc lamp, searchlight or other means. The length of time the phosphorescent glow lasts depends upon the kind of material, its color, the amount of the material and the character of—and length of—the stimulation.

Among the objects shown illustrating the possibilities of the invention to aerial navigation at night were about a dozen small model aeroplanes in various colors, which glowed beautifully in the dark for a considerable period after exposure to the mercury arc lamp, a model of the Zeppelin dirigible, a model of a spherical balloon, and a large bouquet of cloth flowers such as ladies wear in their hats, the roses, lilies, daisies, pansies, etc., glowing brilliantly in their natural colors as the bouquet was carried about the room. Toys, statues, signs, etc., were also exhibited.

One of the most interesting things shown was a model of a luminous landing stage in white at one end of which was grouped a row of aeroplane sheds in colors with distinguishing letters and numbers on the roofs while a bright red monoplane was shown descending from the sky upon the landing stage.

It is self-evident that aerial night travel by aeroplane dirigible and spherical balloon must become extensively employed at a no distant date and means must be used to give light about the aerial vehicles and also to notify the aerial traveler of the whereabouts of safety landing stages.

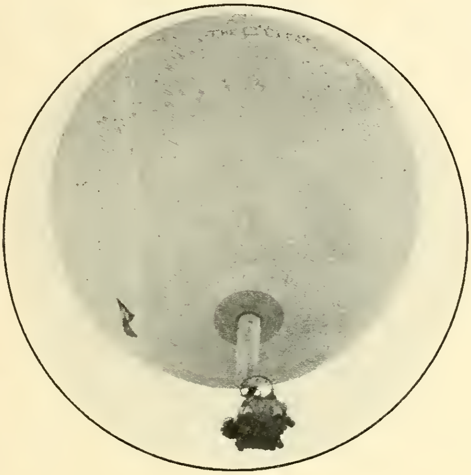
Upon dark nights the pilot observing a tiny patch of "condensed moonlight" far below him will descend with perfect assurance that he will not only find there a haven for himself and his machine, gasoline or repair material, but he will feel assured that no buildings, wires, trees or other obstructions are in the immediate neighborhood; and, furthermore, there will be no confusing glare to endanger his landing.

Mr. Hammer explained that while he was the first person to demonstrate the application of phosphorescent materials in the field of aeronautics, ordinary luminous paints and compounds have been employed for various other purposes but they were very unsatisfactory as to quality and gave only a greenish-blue light, producing an uncanny and ghostly effect, whereas by his system various brilliant colors could be produced from one common substance and he had succeeded in making, among other things, a very white phosphorescent material. Professor Walther Nernst, one of the leading chemists of the world, told Mr. Hammer after witnessing experiments in Mr. Hammer's laboratory, that he was the only man in the world who had been able to make a white phosphorescent material. Mr. Hammer worked for a number of years endeavoring to apply his theory of combining phosphorescence and fluorescence in his production of colored phosphorescent material. He finally succeeded and the discovery formed the basis for his invention.

Those who are interested in looking further into the process will find it fully explained in his U. S. Patent entitled "Art of Making Phosphorescent Colors," No. 12,812, of June 16, 1908.

Aeronaut Leo Stevens

Leading Balloon Builder of the World



Balloons

to carry One to Fifty Passengers

Leading Sportsmen use a Stevens Outfit

AIRSHIPS, AEROPLANES AND BALLOONS OF EVERY DESCRIPTION

USED BY NINETY-FIVE PER CENT. OF THE CLUBS IN THIS COUNTRY AND CANADA

GAS GENERATORS, PARACHUTES, SAFETY-PACKS

If It's in the Aerial Line, Let Me Estimate

Box 181, Mad. Sq., New York

[A]ERONAUTICS

[WI]TH WHICH IS COMBINED **FLY**

Official Organ and Bulletin—Aero Club of Pennsylvania
The Aeronautical Society


Bosch Ignition
Gives Maximum Efficiency
IT is possible to obtain the maximum power from your engine only when your ignition system supplies efficient, never failing sparks that occur without lag. Bosch ignition systems are the type that will provide such ignition as is desired for the exacting work of aviation; they are dependable, efficient and long lived.
Be Satisfied Specify Bosch
Correspondence Invited
Bosch Magneto Company
201 West 46th Street : New York

TECHNICAL TALKS—by M. B. Sellers

AEROPLANE EFFICIENCY (Continued)

In the previous article (AERONAUTICS, March 31st, page 85, line 8 from end), the word "assure" should be "assume"

We assumed a ratio between kA and $\frac{W}{E}$ and called it n; and we found that the power, P, would then vary as $(\frac{V^3}{n}+V)$. I suggested a trial value for n of 1000, when metric units are used and when V is in *metres per second;* whereas, when English units are used and V is in *miles per hour, n* will be very near 5000.

"P" here means the power delivered by the propeller; but if the same propeller efficiency can be attained in machines of different speeds we can substitute the horsepower of the engine for this value.

For direct-connected propellers the efficiency increases somewhat with increasing aeroplane speed; but for our present purpose we can call P the HP of engine.

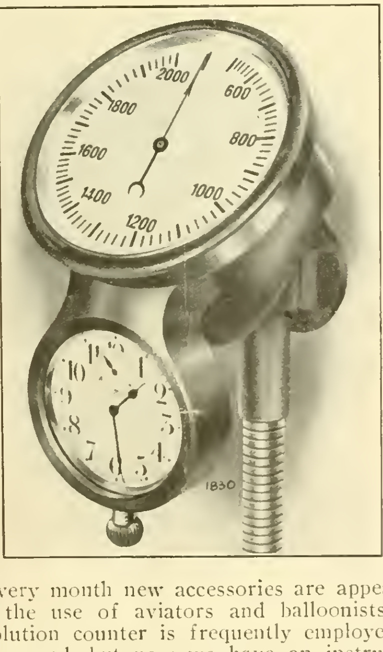
We have assumed also that the power varies as the weight. We have, therefore, for our expression of aeroplane efficiency $E=\frac{W}{P}(\frac{V^3}{n}+V)$; that is, the weight carried per horsepower multiplied by what we may call the speed factor. This factor we may write $V(\frac{V^2}{n}+1)$.

Now, no matter what speed *unit* we employ, the numerical value of $(\frac{V^2}{n}+1)$ must be the same for a given *speed.* We can, therefore, plot a curve with the values of V as abscissas, and $(\frac{V^2}{n}+1)$ as ordinates. The value found on this curve for any speed need then only be multiplied by V, in the desired units, to get the speed factor.

(To be Concluded.)

MORELL TACHOMETER

With the years of progress in automobiles came various devices of value or interest to be used in their operation, such as speedometers, clocks, average speed recorders, gasoline gauges, tachometers, radiator temperature thermometers, etc.



Every month new accessories are appearing for the use of aviators and balloonists. A revolution counter is frequently employed on the ground, but now we have an instrument which shows at all times when the machine is in flight the exact r.p.m. the propeller or engine is making, an instrument which may be placed at any convenient spot within the pilot's vision. With increase in engine speed, the consumption of gasoline may run up out of proportion, depending on the form of the propeller and the resistance of the entire machine. The most economical speed can be ascertained and thereafter maintained by means of the Morell "Phylax" tachometer, handled in this country by Schuchardt & Schutte, of 90 West street, New York. The illustration shows this instrument, which sells here, duty paid, for $32. With the clock, it may be had for $41.

Now a word as regards Mr. Sperry's criticism of my lecture given in New York October 14 (see p. 210, December AERONAUTICS, 1913). I am glad Mr. Sperry wrote as he did. His criticism was necessary because in my lecture I did not make plain the fact that I was considering only the direction of the couples and not their magnitude and I did not state as I should have done why I believe the righting couple should reside in the supporting surfaces and not in a tail.

The example given by Mr. Sperry is not fairly chosen. He chooses as an upsetting couple a change from 5° to 8°. He should work it out on a basis of the maximum upsetting couple, that is, from 0° to 16°. He would then have a movement of the c. of p. (for a Bleriot wing) of 30% of the chord instead of 2½%. Now, while the tail can take care of this, there is a lag in the introduction of the righting couple which is bad. First the gust strikes the main surface, tends to stall it and then it strikes the tail and rights the machine. The faster a machine flies the less is the lag in the righting couple.

However, I must say no more now. I shall answer Sperry more fully in a later issue of AERONAUTICS when I have finished some experiments with a large machine which I am testing.

—*A. A. Merrill.*

EDITORIAL

THE PETITION OF CAPTAIN W. I. CHAMBERS

This petition is a glaring example of injustice, by which one of the most progressive officers of the Navy, while yet in the prime of life, was made a victim of the pernicious "plucking" system.

It is the case of an officer whose career of over forty years of honorable and distinguished service has been absolutely without a blemish; of an officer who has served faithfully, zealously, in all quarters of the world, with his chief interest centered in giving the best there was in him to his country, even in his leisure moments when off duty.

He has served on board eighteen ships of various types, commanded successfully six ships, including a first-class modern battleship, and has even had a squadron of six vessels under him during an important epoch. He has gone through all the hazards and tests of this long service without a reprimand or a punishment, and with nothing less than praise for his ability. Fearless in hs devotion to duty, never shirking either hard work or responsibility, he has accomplished much for the Navy outside of his routine duties. Such a man the Navy system should protect from sacrificing to the utmost his personal interests to the faithful discharge of more than duty.

While in command of the battleship Louisiana, and after winning the official commendation of the Navy Department for efficiency, he was specially selected for new and important duty on shore, for the reason that he was considered the best equipped of all officers for that duty, being detached from sea duty at this time against his wishes, and that this enabled the new administration, through this new ruling, to jeopardize his chances for promotion to a rear admiralship.

He was picked to start the development of air craft for naval purposes. In this he was absolutely alone, without even a clerk to assist, in his struggle against skepticism on one hand and the extravagant demands of the enthusiasts on the other, and he met with such distinguished success, against tremendous odds, in this new and technical work as to place our Navy ahead of all other navies in the practical development of air craft, and at least expense, in a short space of time. And while absorbed in these exacting duties he was apparently expected to personally provide a relief in order that he might go to sea again, to satisfy a recent ruling of the Navy Department concerning sea service—a ruling that has never been published to the service or embodied in Navy Regulations.

It is, of course, possible for the Navy Department, as a military organization, to order its officers to any duty, and in times past, as is shown by this petition, it was customary for the Department to issue preparatory sea orders a month or so in advance to officers on shore duty.

Throughout his exceptionally busy and arduous duty on shore in connection with aviation, Captain Chambers always kept himself in readiness for a sudden call to any duty. Notwithstanding his absorption in the details of a difficult duty, he had even exerted himself to familiarize a relief with those details, in order that he might turn over the responsibility to another and be free to obtain more sea service before promotion.

He was suddenly confronted with the information that he was expected to *apply* for sea duty to avoid being "plucked." And here is where the sterling qualities of this officer are shown, to his immortal credit. If he had *applied* for sea duty he would have escaped the "plucking." But he was hard at work on a difficult and important problem. His responsibilities were great, for human life was at stake. Should he apply for sea duty, abandon his work in confusion, acknowledge thereby that it was of no importance, and place himself i the category of a shirk who ha been holding down a shore bill for the sake of avoiding sea duty

In the consciousness of the ir portance of his duty to the servic he felt that it would be *coward* to subordinate his personal interes to the faithful discharge of th duty. He, therefore, informed tl Department by letter that he w *ready* for sea duty, and pointed o the importance of being provide with a relief whom he could f miliarize with the details of tl work in hand before his detachmen This he considered for the be interests of the service, and l boldly declared that if the Depai ment were embarrassed in findii a relief or found it expedient delay his orders to sea, he w *willing to risk his chances of pr motion*. He faced the risk of mis ing the goal of his life's ambitic when it was within his power grasp it in such an easy manner.

What an example of pluck ai self-sacrifice to a high sense duty!

The Department did not provic the relief; it did not order him sea, and after he was plucked promptly requested him to contin on this duty at the pay of a l tenant, as required by law fo tired officers on active duty. to his principles, he consent continue the duty until a could be provided. He has tinued on this duty for over seve months, and now that a relief been provided the Departn wishes to retain his services s further.

Senate Bill 4623 has been intr duced for the purpose of enablin Congress to rectify this injustic and to enable Captain Chambers continue this duty efficiently with dignity.

Every soul in aeronautics hono and appreciates Captain Chamber and earnestly hopes that Congre will heed the petition presented it to restore him to the active lis

ADVERTISING TALKS—III.

Provided every manufacturer of aeronautical material in this country had the names and addresses of people known to be actively interested in flying in all the countries of the world, and cost of printing and mailing extensive booklets and circulars need not be considered, how much good would that work do?

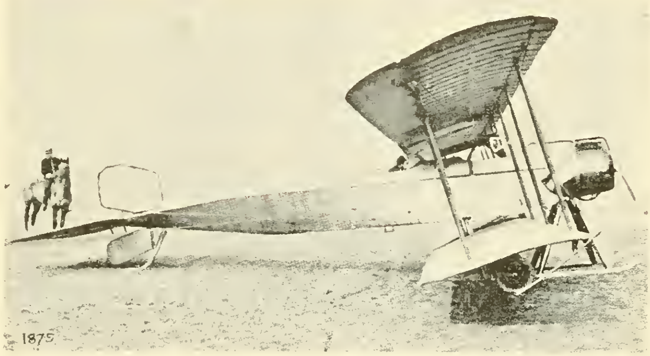
AERONAUTICS goes to bona fide subscribers—civilians, army and navy heads and officers and flyers, governmental branches, aircraft factories and libraries—in this countr Alaska, Canada, British Columbia, Italy, Austria, France, England, Japan, Russia, Mexic Argentine, Brazil, Greece, British West Indie Scotland, Java, New Zealand, India, Sout Africa, Azores, Central America and almos unheard of countries. The descriptions of apparatus given are unbiased, and are certainl worth a thousand times more as a silent sales man than a manufacturer's catalog.

An inflammable dart for use by aeroplanes has been tested at Buc in the presence of military air experts with satisfactory results. The dart carries a small reservoir containing gasoline, which explodes on contact. Its purpose is to set fire to dirigible balloor or buildings.

Three of the darts were dropped from an aer plane at an altitude of 600 feet and found their marl

NEW DEVELOPMENTS IN AERONAUTICS

'HE PAUL SCHMITT VARIABLE ANGLE BIPLANE



Paul Schmitt Variable Angle Biplane

Attention has been attracted to e Paul Schmitt variable angle of cidence machine through the makg of new world altitude records, Garaix, with 3, 4, 5 and 6 pasngers. The application of the inciple of varying the angle of cidence to suit conditions or innation is shown to have been sucssfully accomplished. It permits e following of a horizontal tractory ascending and descending, th a horizontal position of the selage, with maximum efficiency the weight carried and the power nsumed.

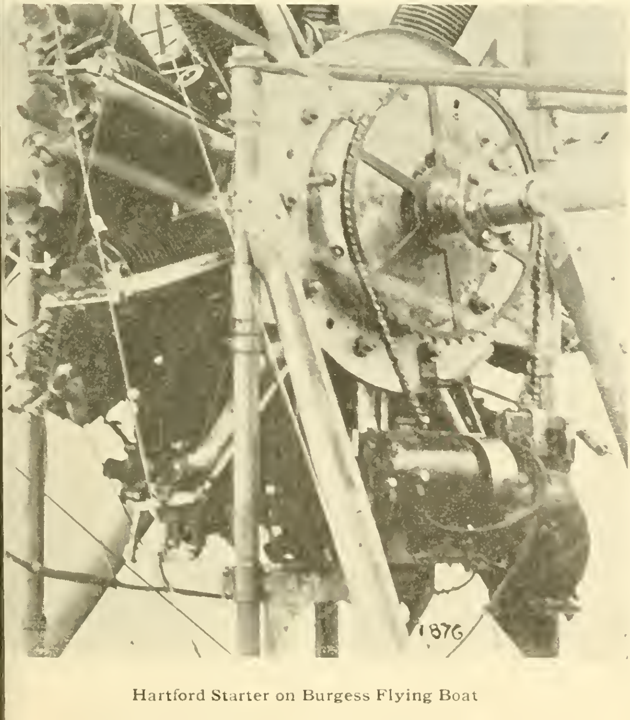
Particularly effective in this maine is the 3-point method of susnsion holding the sustaining surces. It took four years of con-'entious thought and experiment arrive at this degree of success. The fuselage is suspended by two \" frames from cross members tween the front and rear struts the central section. At the bot-'n of the fuselage a long screw d nut alters the relationship been the fuselage and the wings. chain from the operating handle ns over a sprocket at the end of e long screw.

The fuselage is constructed enely of steel tubing autogenously :lded. The cross section is quadngular just at the rear of the iator's compartment, converging om there to a triangular shape ar the rear; or, from rectangu-, trapezodial to triangular. At ch extremity of the small planes n elastic skid to reduce the of a bad landing. At the of the main planes are movilerons of large dimensions, ng lateral stability. The elevator is mounted at the extreme rear of the fuselage, and satisfactorily performs its functions in conjunction with the changes in the angle of incidence. The rudder, in two parts, is arranged along the medial line of the fuselage. The landing chassis, very strong, carries two reinforced skids upon which stands the fuselage, supported by six strong posts cross-braced, and four wheels on the same axis, each pair separated by a skid.

The power plant is a 160 h.p. Gnome motor and direct-connected propeller.

Upper planes spread, 57.40 ft.; lower, 41 ft.; total surface, 486 sq. ft.; length over all, 32.8 ft.; weight, 1,430 lbs. empty; carrying 990 lbs. of passengers, fuel and oil for four hours the total weight would be 2,420 lbs.; speed, 65 m.p.h. It requires nearly 300 ft. to get off in, and can start in an inclosure with walls 7 ft. high with a run of 393 ft.

The maker claims a speed range of from 43.4 to 74.4 m.p.h.



Hartford Starter on Burgess Flying Boat

SELF-STARTERS FOR FLYING BOATS

The photograph shows the self-starter on the 220 Anzani equipment of the Burgess flying boat delivered to R. J. Collier. This self-starter develops 15 h.p. and weighs with the battery 125 pounds. With it the operator starts the motor by simply pressing a button, which closes the circuit and the electric motor revolves. After it has reached its high speed the clutch throws in the pulley connected to the chain drive and the main shaft of the Anzani motor.

This is the first installation of a self-starter of this kind in an aeronautical equipment. It is interesting to know that with the propellers the power plant complete weigh 1,018 pounds.

The propellers are of the Burgess double two-bladed variety, with a special Burgess hub.

The Hartford starter (Hartford Suspension Co., Jersey City, N. J.) installed on the Collier flying boat is of the free motor type, which means briefly that the electric motor with its flywheel runs freely for a few seconds, allowing an immense amount of power, which is stored during that period through the medium of the flywheel, to be applied instantaneously to the engine, thereby carrying the pistons through the points of compression much more rapidly than if the load was encountered directly. This feature is of considerable moment with reference to the electrical starting of aeroplanes or flying boats, and no doubt it is distinctly obvious to aeroplane designers, who are constantly endeavoring to obtain for their respective designs the greatest possible power per pound weight, since they are perfectly familiar with the speed factor and its value where pounds per horsepower is the paramount consideration. With this fact in mind the starter was designed, and it is stated that the Hartford starter is the most powerful starter in the world, considering it on terms, horsepower per lb.

This starter is especially efficient in starting a cold engine, since its normal power may be increased many times by allowing the electric motor to run free for a few seconds until the momentum of the flywheel has reached its maximum; then all of this stored energy is added to the normal power of the motor and is applied instantly to the engine, and by this method the engine may be started even after being out of service for extremely long periods.

However, after the engine is warm, an almost direct application of the starter may be made.

MEASURING SPEED

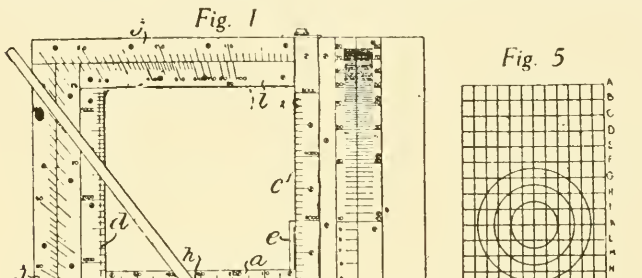
Since Riley E. Scott showed how to measure speed over the ground from a flying aeroplane, in the aiming of bombs, several devices have been brought out abroad to accomplish the same result. M. Berthelot is one who has produced a device which permits calculation of speed by measuring the distance passed over, the height of the machine being known.

Using Scott's simple method, all that is needed is a telescope, stop watch and accurate barometer. The height is known. The telescope is set at an angle of 45 degrees. As some prominent object lines up with the cross-hairs of the telescope the watch is started. A straight course is flown. The telescope next is set at vertical. As the object again comes under the cross-hairs the watch is stopped. If the height be 1,000 ft., we now know the machine has traveled a horizontal distance of exactly 1,000 ft., and we know the time it took. A calculation or a set of tables tells the sped.

In 1911 one A. S. Marks, of London, patented a device (No. 14,180) of this character. The instrument is composed of adjustable scales and optical apparatus, and designed for determining the moment at which a shell should be released from an air vessel in order to strike a given object. Only the speed measuring part is here described.

An elevation and plan of the scaled instrument are illustrated in Fig. 1. The optical device shown in Fig. 2 is used in judging the speed. Figs. 3, 4 and 5 are diagrams referred to below. The apparatus (Fig. 2) which is employed for determining the speed consists of a camera or similar optical projecting apparatus carried by the air craft, so that the line of sight is perpendicular to the line of flight. For convenience in operation, the casing is divided into two parts containing the lenses "o p." The mirror "q" is fixed in the lower portion of the casing to deflect the rays in the proper direction to be received by the eye of the operator. A prism would be equally convenient for this purpose. When the apparatus is moved in a direction towards an object, the image travels in the same direction as the object itself appears to travel. The lens "p" is preferably provided with fiducial lines, "r s" determining the limits of the field. The distance between the lines "r" and "s" is adjusted in relation to the focal lengths of the lenses, so that the actual distance traveled over the ground by an air vessel at a particular height is represented by the virtual distance "r s," and is a known factor of the height. If the focal length is double the length between the lines "r s" and the air vessel is at a height of 1,000 ft., then the air vessel would travel a distance of 500 ft. during the time which it took the image of an object to travel the length "r s" on the lines or screen "p." By means of this instrument and stop watch, a ready means is provided, it is claimed, for ascertaining the speed. If the object observed were also moving, the observed speed would be the difference or sum of the two speeds.

To avoid calculations unsuitable for the circumstances, the speed may be graphically determined by the instrument illustrated in Fig. 1. it is provided with the pair of scales of velocity "a" and "b" and the vertical scales of height "c" and "d." These may be colored differently as a help to easy reading. The scales "a" and "b" are adjustable with regard to the vertical scales "c" and "d." They slide and clamp on the rod "f," which is fixed to the vertical scale of height "c." The pointer "g" is pivotally mounted on the scale "c." A rest for the pointer is formed in the slotted block "h," which is adjustable in the space between the velocity bars "a" and "b." The two scales "j" and "l" indicate respectively angles and speeds. The observed time taken by the image of an object upon the earth to traverse the screen from "r" to "s" is noted, and the sliding piece "h" is brought opposite to this observed time upon the scale "a," the graduations of which indicate time in seconds. The velocity bar has previously been set to the height on the scale "c." The barometer is consulted for height. On bringing the pointer "g" to its position of rest within the sliding hook "h" the speed of the craft is recorded upon the inner scale "l," the graduations of which indicate miles per hour.



AIR LIFE PRESERVERS

In a letter to AERONAUTICS Stanley Y. Beach discusses the recent fatal accidents in our Army and abroad. "Had he (Murray) worn a Stevens safety pack," he says, "his life would have been saved. Lieut. Murray stayed in his machine and was plunged in the Atlantic, his regular life preserver failing to save him from death by drowning after he had survived the shock of the plunge. Had he worn an 'air' life preserver he could have jumped out of his machine and descended safely to the sea below whereupon his cork jacket would keep him afloat till rescued. The safety pack, which is worn like a knapsack, weighs but 4½ pounds—much less than the regulation life preserver; yet it will surely open and check the fall if this is through a distance of 100 feet.

"Now that a flying boat is considered to be a motor boat, and must carry all the latter's paraphernalia, by all means compel the aviator and passengers to wear 'air' life preservers. All aeroplanes, balloons and dirigibles should be equipped with enough safety packs to go around, so that passengers as well as pilot would be protected in case a wing should break or a balloon deflate or explode. Had the men on the ill-fated Zeppelin L-II worn 'air' life preservers most of them would be alive to-day. The Secretary of Commerce, and Congress, should pass a bill requiring all aircraft to have some form of approved safety parachute."

"GYROPTER" OF PAPIN AND ROUILLY

The adjoining illustration shows a urious machine which is said to ave been ordered by the War Department of France, and surrounding whose tests by army officers there s much secrecy. From what can e learned, first trials have proven satisfactory.

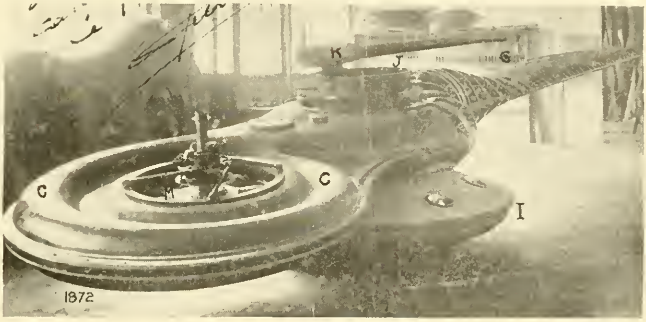
The machine is intended to scend or descend straight, stand or dvance at will in the air, and come down slowly when the motor stops. The model in Nature is the winged sycamore seed, which descends to he ground very slowly, turning as it goes. Substituting for that of gravity an internal force which will rotate the leaf and keep it at a positive angle, it is argued it would ise.

The machine designed by A. Papin and D. Rouilly is a propeller with out one great hollow blade, A. In place of another blade is a housing, CC, containing a motor, whose plane of rotation is parallel to that of the machine, all carefully balanced. To he engine are attached blades which produce an air current, which travels hrough the inside of the wing and out of its extremity through an oval orifice, G, at the rear edge of the wing. The speed of the air through ts channel is said to be 200 meters a second, and produces a reaction against the surrounding air, which gives the wing a forward rotary motion. This, combined with a proper angle of incidence, gives the apparatus ascensional power. The end of the wing is terminated by a "banderolle" floating freely in the stream.

The motor, M, is cooled by the blast of air entering through the ventilator on its way to the wing.

A circular hull is provided, in which compressed air is used as a shock absorber, to form the landing gear, I, of this new craft, or to support it on water. The operator stands in the circular central car, J, which is mounted on balls and wheels, and prevented from turning by an escape of air through the tube, K, which can be regulated at the will of the aviator. This same tube is used to steer the device up, down or sideways.

The main structure is of wood and weighs 380 kg., motor included. The gyroscopic effect of the machine is made use of in maintaining the machine at a positive angle when turning at normal speed. The angle of incidence becomes zero or even negative when the motor stops. The "length" is given as 14 meters. The machine is entered for the great French safety prize.



SIKORSKY AEROBUS A WONDER

The new second "aerobus" Sykorsky certainly holds the world's record for passengers carried at one time. On Feb. 25, at St. Petersburg, he carried 16 passengers for 18 minutes, the useful weight aggregating about 2,860 lbs. Later he carried nine inclusive for 2 hrs., 6 mins., at 1,000 metres height—the record of the world for height and duration with nine on hoard.

Technical details: Biplane, spread, 121 ft.; length, 65.6 ft.; surface, 1,956.5 sq. ft.; planes form a vertical "V"; gap, 9.18 ft.; chord, 9.18 ft.; 3 vertical rudders of 53.75 sq. ft.; horizontal tail of which one-half forms the elevator; weight about 7,700 lbs. empty, or 10,560 lbs. with 16 aboard. Using the Argus 100-h.p. motors, the weight per horsepower, 26.4 lbs., and 5.3 lbs. per square foot.

The distinctive feature is the fuselage, 5.24 ft. wide in front, 1.96 ft. wide in rear and 5.9 high. In front is pilot's compartment of 10.75 sq. ft., next a passenger saloon of 10.75 sq. ft., a cabin of 3.22 sq. ft., the whole lighted on each side by four windows and three portholes, electrically lighted, and heated by the motor exhaust.

The power plant used has been the four Argus motors, but two 200 Salmson engines are to be tried. The four engines are placed in pairs on each side of the fuselage, connected for operation either separately or ensemble. The front motors drive one propeller; the two in the rear drive another. They are all started with compressed air.

The Russian Navy has ordered four machines of this type. The illustration shows the inside of the passenger saloon.

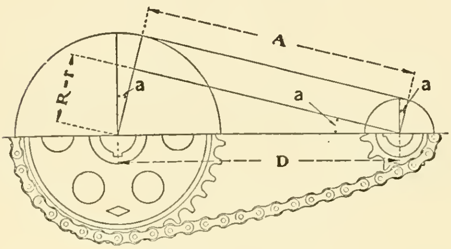
FRANCE PREFERS FIXED CYLINDERS.

A recent circular sent by the French Minister of War to automobile makers asks them to consider the development of aeronautical motors, for military purposes, especially of the fixed type.

Capt. Thomas S. Baldwin leaves for Europe in a few days to look over the dirigible crop in the interests of the newly-formed Connecticut Aircraft Company (lately Connecticut Aeroplane Company), of New Haven, with which company he has signed a two-year contract. A small dirigible, about 5-man size, will shortly be finished. This will be in the so-called "vedette" class, lately specified in the Navy's appropriation layout. The company is capitalized at $500,000, and has behind it representative business men of New Haven. Aeroplanes will also be produced.

AERO ENGINEERING DATA

FORMULA FOR CALCULATING LENGTH OF CHAIN.



(All Dimensions in Inches)

D = Distance between centers.

A = Distance between limits of contact.

R = Pitch radius of large sprocket.

r = Pitch radius of small sprocket.

N = Number of teeth on large sprocket.

n = Number of teeth on small sprocket.

P = Pitch of chain and sprockets. (Distance from center to center of chain pins).

$180° + 2a$ = Angle of contact—large sprocket.

$180°—2a$ = Angle of contact—small sprocket.

$$\text{Sin } a = \frac{R - r}{D}$$

$$A = D \cos a$$

Length of chain $= L$

$$L = \frac{(90 + a)\,NP}{180} + \frac{(90 - a)\,nP}{180} + 2A$$

HORSEPOWER FORMULAE.

Four-Stroke Cycle Engines.

Authority	Formula.
A. L. A. M. and Royal Auto Club....	$\frac{D^2N}{2.5} = \text{H.P.}$
Brit. Inst. of Auto. En.	$0.45\,(D + L)\,(D - 1.18) = \text{H.P.}$
E. P. Roberts....................	$\frac{D^2LRN}{18{,}000} = \text{H.P.}$

D — Diam. of cylinder in inches.
L — Length of stroke in inches.
R — Rev. per min. of crankshaft.
N — Number of cylinders.

Derivation of the A. L. A. M. Horsepower Formula. The indicated horsepower of a single-cylinder four-cycle engine is equal to one-quarter times the mean effective pressure P, acting throughout the working stroke, times the area of the piston A, in square inches, times the piston speed S divided by 33,000, thus:

$$\text{I. H. P.} = \tfrac{1}{4}\,\frac{P\,A\,S}{33{,}000}$$

Multiplying this by the number of cylinders N gives the I. H. P. for an engine of the given number of cylinders, and further multiplying by the mechanical efficiency of the engine E gives the brake horsepower. Therefore the complete equation for B. H. P. reads:

$$\text{B. H. P.} = \frac{P\,A\,S\,N\,E}{33{,}000 \times 4}$$

The A. L. A. M. assumed that all motor car engines will deliver or should deliver their rated power at a piston speed of 1,000 feet per minute; that the mean effective pressure in such engine cylinders will average 90 pounds per square inch, and that the mechanical efficiency will average 75 per cent.

Substituting these values in the above B. H. P. equation, and substituting for A its equivalent, .7854 D^2, the equation reads:

$$\text{B. H. P.} = \frac{90 \times .7854\ D^2 \times 1{,}000 \times N \times .75}{33{,}000 \times 4}$$

and combining the numerical values it reduces to:

$$\text{B. H. P.} = \frac{D^2N}{2.489}$$

or, in round numbers, with a denominator 2.5.

H. P. TABLE BY A. L. A. M. FORMULA

In using table, find bore of cylinder in inches or millimeters in the proper left-hand column, then read across to right under column for the number of cylinders that the motor under consideration has.

Bore = D		Number of Cylinders = N.		
Inches.	Millimeters.	4	6	8
2½	64	10.00	15.00	20.00
2⅝	68	11.23	16.85	22.05
2¾	70	12.08	18.13	24.20
2⅞	73	13.37	20.00	26.45
3	76	14.40	21.60	28.80
3⅛	79	15.64	23.50	31.25
3¼	83	16.92	25.39	33.80
3⅜	85	18.21	27.30	36.45
3½	89	19.61	29.45	39.20
3⅝	92	21.08	31.57	42.05
3¾	95	22.50	33.75	45.00
3⅞	99	24.22	36.32	48.05
4	102	25.60	38.40	51.20
4⅛	105	27.20	40.80	54.45
4¼	108	29.00	43.50	57.80
4⅜	111	30.65	46.00	61.25
4½	114	32.40	48.60	64.80
4⅝	118	34.28	51.41	68.45
4¾	121	36.15	54.20	72.00
4⅞	124	38.25	57.21	76.0[illegible]
5	127	40.00	60.00	80.00
5⅛	130	42.20	63.20	84.05
5¼	133	44.20	66.40	88.20
5⅜	137	46.34	69.50	92.45
5½	140	48.48	72.72	96.80
5⅝	143	50.80	76.10	101.25
5¾	146	53.00	79.50	105.80
5⅞	149	55.28	82.88	110.45
6	152	57.70	86.64	115.20

U. S. AVIATION RESERVE

The names and address of the members of the U. S. Aviation Reserve, organized recently by Albert Bond Lambert, have been filed with the War Department. Most of the members are aeroplane pilots, while some are balloon and dirigible men.

It might be suggested that arrangements be made with the Chief Signal Officer for using the members of this Reserve during maneuvers and in connection with other experiments conducted from time to time in which the Army aviators are employed, bare expenses to be stood by the Government. This would give the civilian flyers such instruction and practice as would fit them for efficient service in time of war. Without such practice, civilian aviators have been shown to be of little value. The same might be done with the Navy. Members of this organization should take up this work in the spirit of patriotism and devote a certain portion of their time along this line, just as National Guard men do each year.

Aviation is a good deal of a failure.—*Galveston News.*

So are ice cream parlors on the fringes of Hades.

News in General

BILL FOR AVIATION SECTION MAY NOT PASS.

The Hay bill (H. R. 5304) may not be reached at this session of Congress, owing to the disturbed political condition. When called up two weeks ago it was put back in storage.

This bill provides: for (1) an aviation section as a part of the Signal Corps, charged with the operation of all military aircraft, aeronautical appliances and the duty of training officers and enlisted men in aeronautical matters; (2) for, in addition to such officers and enlisted men assigned from the Signal Corps at large for duty in such section, not more than 60 aviation officers and 260 aviation enlisted men, the latter officers to serve for four years; (3) that there shall be constantly attached to the aviation section a sufficient number of aviation students to make, with the officers actually detailed in such section, a total of 60 aviation officers and students constantly under assignment to said section, the aviation students to be unmarried lieutenants under 30 years, who shall remain attached to aviation not to exceed one year, to determine their fitness for detail as aviation officers in the section, no person to be assigned against his will; (4) that aviation officers be classed "junior military aviators" and "military aviators"; (5) that each aviation student, while participating regularly in flights receive 25% increase in pay of his grade; (6) that each junior military aviator shall have rank and pay one grade higher than that held by him under his line commission, and an increase of 50% in pay of his grade while regularly flying; (7) that each military aviator be likewise raised allowed 75% increase, the number with this title not to exceed 15; (8) aviation enlisted men include signal electricians, sergeants, cooks and privates, of which not more than 40 at a time may be rated as "aviation mechanician," the mechanicians while engaged in flying to have an increase of 50%; (9) junior military aviators, military aviators and aviation mechanicians must obtain certificate from examination board; (10) junior military aviators must serve as aviation student for certain period; (11) to become military aviator, at least three years must be served as junior military aviator; (12) that the widow of any officer or enlisted man who shall die as the result of an aviation accident shall receive a year's pay.

BUILDING VARIABLE SURFACE PLANES.

The Italian Aeroplane Company, 607 Webster avenue, Pittsburg, Pa., announces that it is building a powerful aeroplane with wings of variable surface, loaded to 25-30 kg. per sq. m. Two 200-h.p. motors will be used, driving three propellers. The engines can be run independently. The engineers are Severino Giuliano and Cesare Canovetti, who are said to be well-known men in Turin and Milan.

NATIONAL BALLOON RACE

In the national championship balloon race, starting from St. Louis July 4th, the prizes are as follows: First prize, $400; second $300; third, $200; fourth, $100.

Each contestant will be allowed $150 for expenses, provided the start is made.

Entries close May 1st. Check for $100 must be sent to the Aero Club of America, which will be returned if the start is made, except to the winner, who will be appointed on the international team for the race from Kansas City.

Gas, labor, sand, etc., will be furnished free to all contestants. The race will start from the motordrome. Grand stand and track completely surround the field, providing a shield 60 ft. high from the wind.

For further information address R. E. Nolker, president Aero Club of St. Louis, 15th and Pine streets.

WRIGHT FLYING BOAT FOR THE NAVY.

The first Wright flying boat has been delivered to the U. S. Navy for use at the Pensacola aviation school.

$300,000 NOW FOR U. S.

Pleading before the Senate Committee, the Secretary of War succeeded in getting the $50,000 put back in the appropriation for aircraft, making it again $300,000.

ARMY FLYING.

The record of flights at S. C. Aviation School, San Diego, Cal., for the two weeks ending March 28, 1914, are as follows:

Total number of flights, 60; total time in the air, 16 hrs., 47 mins.; passengers carried, 31. There are but five machines now in service in the Army.

Summary, Jan. 1 to March 28: Total time in the air, 207 hrs., 42 mins.; total number of flights, 800; passengers carried, 387.

BURGESS TO MARKET MOTOR OF NEW TYPE.

Work has advanced rapidly but quietly on the new 16-cylinder motor designed by W. Starling Burgess and built by the makers of the White automobile. Imagine two 8-cylinder "V" motors placed base to base, and you have it. This construction saves a great deal of weight. The head-on appearance names the new type the "X."

IMPORTS AND EXPORTS

Imports of 'Planes and Parts: January, $5,673; for 7 months ending January, $26,233; same period, 1913, $51,796.

Exports of Domestic 'Planes and Parts: January, $15,114; for 7 months ending January, $69,119; for same period, 1913, $79,153.

Exports of Foreign 'Planes and Parts: January, none; for 7 months ending January, $4,949; same period, 1913, $43,810.

In Warehouse: January 31, none; January 31, 1913, $19,516.

PROGRESS ON FLIER.

Steady progress is being made in the construction of the Curtiss transatlantic flier ordered by Rodman Wanamaker, and in arranging the thousand and one other details that enter into the problem. To one unfamiliar with the mysteries of aeroplane construction, however, the work as it stands carries no definite impression of what the finished machine will be like. There are big wings in one shop, the 200-h.p. Curtiss motor in another building, special forgings in the blacksmith shop, other metal parts in the tinsmith's shop; there is the skeleton of a 40-ft. structure in the aeroplane room, and a big temporary pontoon in the boat shop. Only those who know the "game" realize that within forty-eight hours after these various parts are finished the entire machine may be assembled ready for flight.

In other directions much work is being done. From England Lieut. Porte, pilot of the Wanamaker flier, has notified Glenn Curtiss of the development of a scientific instrument which records the speed of a flying machine in relation to the earth. The same instrument also indicates the direction in which the machine is flying. If as accurate as claimed, Mr. Curtiss says this will prove an immense advantage to the pilot of the big flying boat.

There is building at the Curtiss factory a new 160-h.p. flying boat. The new flying boat looms very large as compared with the standard four-passenger flying boat. The big fellow is arranged to carry six to eight passengers, and if it was thought desirable to do so, two full-length berths could easily be arranged in the after cockpit. This probably will develop into a stock model flying boat for use as a private cruiser or as a military transport.

NO LICENSES YET.

All these stories of Beachey and world race having obtained Wright license are pure bunk, according to Alpheus S. Barnes, secretary of the Wright company, at 11 Pine street, New York. Mr. Barnes says that no one has been granted a license.

Your paper makes a man think—therefore, the questions.—J. A. C., Pennsylvania.

MARTIN FLIES 14,200 FT. TO NEW RECORD.

Pomona, Cal., April 6.—Attaining an altitude of 14,200 feet, Glenn Martin broke McCauley's American altitude record.

Berlin, March 31.—*World 2-Man Height Record.* — Linnekogel and passenger set the mark at 6,300 m. (20,664 ft.). Rumpler monoplane.

Chartres, March 28.—*World 9-Man Height Record.*—Garaix and 8 passengers made 1,550 m. (5,084 ft.) altitude with the Schmitt variable angle biplane.

Bitterfeld.—83 *Hours in the Air.* —The new balloon duration record of Hugo Kaulen has been officially confirmed. With two companions in a hydrogen balloon, he traveled 2,827.9 kilometers, starting from Bitterfeld, Germany, on Dec. 13 last, to near Schnabnitzy, Siberia, up for 83 hours. The old duration record was 73 hours 47 minutes. On March 7, 1914, Berliner made 2,977 kils., which is the record of distance.

Robert Thelen, who made an altitude record with three passengers on March 20 at Johannisthal, used a Mercedes motor in his Albatros biplane, which was fitted with a Bosch magneto, a Bosch starting apparatus and Bosch plugs.

CURTISS INVENTS AIR SKIING.

Hammondsport has discovered a new sport, claimed to be even more fascinating than the standard flying boat. The new game is snow boating, and it proved such fun that for the first time in the history of local aviation the fliers are sorry to see the snow fast disappearing.

The discovery that a flying boat or standard type of hydroaeroplane would handle as well on snowbanks as on the water was almost accidental. Some experimental flights had been planned during February, but when the machines were ready, a cold snap had set in, Lake Keuka was frozen solid, and soft snow lay over the ice to a depth of nearly 2 feet. It was evident weeks must elapse before open water would again be seen, so Curtiss thought to fit the machines with broad runners or skiis. Before trying these, he tried running the machine in the snow, and found to his surprise that the pontoon of the hydroaeroplane worked to the surface of the snow just as a hydroplane at speed drives up out of water. After that simple demonstration, the rest was easy.

Sliding at 30 to 50 miles an hour over the snow proved as exhilarating as sliding over the water; perhaps more so, for the inequalities of the snow surface were less than those of the water; there was no splash or thump of waves, no shower of wet spray; there was complete silence except for the exhaust of the motor, the swish of an occasional flurry of snow disturbed by the boat and driven by the whirling propeller.

At intervals during the past two months snow boating has been indulged in. William S. Luckey, winner of last fall's aeroplane race around Manhattan, found that the machine would plane or glide over the surface with considerable weight aboard, and on several occasions he carried two, three and even four passengers, bestowed about the craft. Next winter it is probable considerable attention will be paid to the development of snow fliers, because of the avowed intention of Amundsen and other polar explorers to try aerial locomotion in the arctic regions.

Messrs. White & Thompson, of Bognor, England, are building a large Curtiss flying boat for the race around Great Britain, for which Lord Northcliffe has offered a special prize of $25,000. Two attempts were made last fall to accomplish the flight in standard English water flying machines, but both trials resulted in failure. White & Thompson decided to make the attempt in an American type of flying boat, but as the rules provided the machines entered must be built entirely in England, they secured from Glenn H. Curtiss complete plans for the motor and flying boat, both now nearly completed.

NEW SLOANE COMPANY

There has been organized the new Sloane-Daniel Company, which has leased a large factory at Bound Brook, N. J., for the purpose of manufacturing all types of gas engines, both for aeroplane and marine use.

The Sloane Aeroplane Company is now manufacturing aeroplanes on a larger scale, building the new Sloane monoplanes, biplanes and flying boats.

The new motor company has moved into its new quarters and has installed a complete equipment of up-to-date machinery. An order has been received for a special lightweight 400-h.p. marine engine for a 300-ft. cruising yacht now building for Alexander S. Cochran.

Most of the motor machinery located at the Sloane aeroplane plant in Long Island City has been shipped to the new factory, and the additional space thus provided is already being used for the building of flying boats. From now on the whole Long Island City plant will be used exclusively for the manufacture of aeroplanes. There is enough space to facilitate quick work in the building and erection of several machines at a time.

The motors will be constructed under patents issued to Mr. Paul Daniel, who is now associated with Mr. Sloane, and will be built in both the rotary and stationary types. A new rotary type motor has been designed expressly for the Sloane monoplane, and is very compact and light. Both types, however, are equally good on flying boats and biplanes, and will range in power from 80 h.p. to 200 h.p., and possibly in the near future as high as 300 h.p.

The first 80-h.p. rotary motor, which weighs only 160 lbs., has been completed and successfully tested. It is of unique design, very simple and efficient. It is of the 2-cycle, 6-cylinder type.

In the aeroplane factory, the first of the new types of flying boats is now nearing completion, and trials will take place around New York in the near future.

In addition to the flying boat, there is the novel machine of Israel Ludlow's now nearing completion at the factory, a new monoplane, and a special experimental type monoplane receiving its finishing touches. Tentative orders are on hand for several new flying boats and for a special inherent stability machine to be built to the order of a well-known New Yorker.

FLYING-BOAT SCHOOL TO OPEN AT LARCHMONT IN MAY.

With the completion of the first of the series of the new Sloane flying boats, the Sloane Aeroplane Company will open at Larchmont, N. Y., the first flying boat school to be established in the vicinity of New York, which will probably be about May 1.

John Guy Gilpatric, the Sloane chief pilot, will be in charge, and instruction will be by dual control, the pupil sitting alongside the pilot and quickly learning the correct method of operation without any danger.

In addition, a land school will be operated, instruction being given on monoplanes and biplanes.

The Cleveland (Ohio) Aero Development Company has been incorporated for manufacturing and dealing in airships; capital, $50,000; F. E. Shattuck, Karl F. Wetzig, C. P. Shattuck, John C. Murphy and E. E. Shattuck.

Callicotte Airship Company, North Yakima; capital, $300,000; incorporators: A. A. Callicotte, J. L. Callicotte, E. G. Peck and others.

'PLANE FALLS—$3,000.

Mrs. Irene Morrison, alleged to be injured by an aeroplane driven by Arch Hoxey, Sept. 16, 1910, at the State Fair at Milwaukee, was awarded $3,000.

The plaintiff in a suit for $10,000 against the members of the State Board of Agriculture at that time, alleged that while standing in part of the grandstand, watching the aviator's flight, the machine swooped down upon her and injured her back and neck severely. The suit was brought against the members of the Board of Agriculture.

A suit for $50,000 was, prior to this, brought against the Wright Company, but the plaintiff lost, as she failed to show that the accident happened by reason of any negligence on the part of the aviator or the Wright Company. This is the first damages obtained in this country in a suit relating to an aeroplane exhibition which resulted in an injury to a spectator.

GOODYEAR STARTS UP.

The Goodyear Aero Club is about to open its second season with a large and enthusiastic bunch on the waiting list for balloon trips. It is planned to make a pleasure trip almost every week throughout the spring and summer, and in addition to this, plans are under way for experiments in wireless telegraphy and motion picture photography.

At least one new pilot will be trained in the near future. Ralph H. Upson has definitely accepted the invitation offered to defend the Gordon-Bennett Cup next fall and will probably use the balloon "Goodyear" again, which is practically in as good shape as it was when it was built.

The plans of the club in regard to the National Race, July 4, from St. Louis, are not absolutely settled. This contest is an elimination race for the selection of the third member of the American team.

AERONAUTICS

Combined with "FLY"

Published semi-monthly in the best interests of Aeronautics

BY

AERONAUTICS PRESS INC.
250 West 54th Street
New York
Telephone, Columbus 8721
Cable, Aeronautics, New York

ERNEST L. JONES, Editor
M. B. SELLERS, Technical Editor
HARRY SCHULTZ, Model Editor
C. A. BEIER, Advertising

Entered as Second Class Mail Matter, September 22, 1908, under the Act of March 3, 1879. $3.00 a year, 15 cents a Copy.

Postage free in the United States, Hawaii, the Philippines and Porto Rico. 25 Cents extra for Canada and Mexico. 50 Cents extra for all other countries.

The magazine is issued on the 15th and 30th of each month. All copy must be received 6 days before date of publication. If proof is to be shown, allowance must be made for receipt and return.

Make all checks and money orders free of exchange and payable to AERONAUTICS PRESS.

Subscribers will kindly notify this office if discontinuance is desired at the end of their subscription period, otherwise it will be assumed that their subscription is to be continued.

THE CURTISS SCHOOL OPENS.

The annual April migration to Hammondsport has begun, according to L. J. Seely, the famous bard of the trusty typewriter. Chirping, Beckwith Havens breezed in from Cuba with adventurous tales of wild ducks and fish. Not far behind him was Elwood "Gink" Doherty, also fresh from Cuba, Miami and other resorts of the aerial plutocracy. John Lansing Callan, once featured by "Bill" Pickens as "the duck from Dublin," sailed in from Pensacola. Raymund V. Morris is en route from Petersburg with his mono-flying boat. Chas. C. Witmer has started North from Miami, and Stephenson MacGordon is tiring rapidly of Palm Beach. "Doctor" Francis Wildman is preparing to leave San Diego and will again take up his arduous duties as chief instructor at the Hammondsport camp on Lake Keuka. Those who have arrived to date seem mildly surprised and also well pleased that the geographical location of Hammondsport remains unchanged, and it continues to be identified as the one town on the aviation map of America with a ring around it. (Those planning to conduct races for flying boats during the coming season may instruct their printers to ship all entry blanks here. If another prospective entrant should be located later at some other address, the file copy of the entry blank can easily be replevined.) Registrations for the April 15 class are numerous as usual, with prospects that the S. R. O. sign will be hung out as early as last year.

FLY-COP PINCHES FLYER.

Guy Gilpatric formally opened the New York aviation season on April 14, when he flew up Main Street in this town and landed in Central Park, where a "cop" handed him a summons. The complaint will probably be "disturbing the peace" of the other birds of the park. Gilpatric had flown his 50 Gnome remodeled and shortened Dep from the Sloane school at Hempstead, where he is chief instructor, to the park in 25 minutes, with a good, stiff wind in his face. He could not return by the air route owing to the argument with the cop.

A representative of the Sloane Company stated that the flight had been made in response to the urging of the Aero Club for some flying. Now Gilpatric stands in danger of being suspended for flying over the city, which is against club rules. However, it is possible that the exigencies of the occasion may demand the argument of oil giving out, after having been blown out of the intended course, or some other perfectly legitimate excuse.

A NEW GYRO MOTOR

The Gyro Motor Company, of Washington, D. C., has recently developed a new type of intake mechanism which will largely eliminate all possibilities of motor troubles, and thereby render the motor serviceable for long flights. Incidentally it will reduce the amount of oil needed, and block tests have shown an apparent increase of power over the old motor, which, as everybody knows, was already considered a highly efficient power plant.

Other important advantages of the new intake, which will be known as the "Duplex," are that it is accomplished by sliding action only and that the motor can be readily throttled between about 1,300 r.p.m. down to 500 r.p.m., and that any speed may be kept indefinitely if desired. Backfiring is impossible in the new mechanism, which would commend the motor for loop-the-loopers. The "Duplex" intake is on the outside of the cylinder, and the latest design permits the mechanism to be readily detached.

Preparations are being made by the company for increasing its output in order to make quicker deliveries than in the past.

Frank Burnside and Fausto Rodriguez, of the Thomas cohorts of Bath, N. Y., have returned from a pleasant and successful tour of South America.

We are working all the overtime we can possibly get in to even try to keep up.—Kemp Machine Works.

Your magazine has done me an awful lot of good and I get more out of it than from any other magazine I have ever seen.—M. A., Pennsylvania.

BURGESS-DUNNE PROVIDES THOUGHT FOR CRITICS.

Clifford L. Webster is continuing flights at Marblehead with the Burgess-built Dunne machine. When power is shut off the aeroplane assumes a normal and very flat gliding angle without touching the levers. In answer to the question regarding directional control, Mr. Webster claims he has all prizes "cinched" for landing at a certain marked spot. The machine does not nose into a wind as much as it had been expected to, but no difficulty is experienced in keeping its direction at any angle desired with the wind.

Some figures have been noted down and are here published: The net weight of machine is 1,529 lbs.; gasoline, oil and equipment, 191 lbs.; crew, 367 lbs.; total, 2,087 lbs. Ov r a triangular course in an 8-mile wind, with above weights, the speed average was 58¾ m.p.h., with the Curtiss OX motor running 1,300 r.p.m., developing at that speed about 75 h.p.

The Burgess flying boat, now in use in the Navy, with a weight total of 2,102 lbs., with 70 Renault, developed 55 m.p.h., and the Burgess tractor, gross 2,001 lbs., 70 Renault, made 59 m.p.h. during test.

Future machines of the Dunne type will be built lighter. The ability of the machine to control itself leaves the pilot free to take observations and do reconnoisance work without the necessity of carrying a passenger.

Lieut. Milling spent April 6 and 7 with the Burgess Company, during which time he saw Mr. Webster fly the Dunne, make a long glide with it, shutting the engine off while the machine was in flight, and with his hands over his heads and controls locked. Lieut. Milling also took a passenger flight with him and seemed to be greatly interested in the new type.

29 West 39th Street, New York

OFFICIAL BULLETIN.

Next General Meeting.

The next general meeting will be held May 14. It is expected that George Clifton will deliver his postponed lecture on "Aerial Photography" at this meeting. The evening will also be devoted to late developments in aeronautics as portrayed by lantern pictures of new aircraft and accessories, with a popular series of pictures of general aeronautic interest. The next scheduled meeting thereafter will be held on June 11.

New Members.

The following members have been elected: Victor M. Zucchino, 257 Summit avenue, West Hoboken, N. J.; C. W. Buchanan, Monmouth, Ill.; Orville Spreen, 300 New Commerce Bank Building, St. Louis, Mo.; George Rudolff, 365 W. 56th street, New York City.

Data Sheets.

The new technical board, Messrs. Leon Goldmerstein, Ralph G. Guerquin, Rudolph Hanau, William J. Hammer, Earle Atkinson, have inaugurated the issuance of data sheets in convenient form for use with loose leaf books, similar in character to those issued by the Society of Automobile Engineers. These data sheets will be issued from time to time as fast as they can be prepared and furnished to members in good standing. They will contain eventually all engineering data or engineering information relating to aeronautics, such as calculation of chains, lengths and sizes, steel tubing, tables, wire tables, strengths of woods, pressure tables, various statistics, conversion tables, calculations for balloons, dirigible and parachutes, etc. The complete system of sheets will constitute the sum of aeronautic engineering knowledge. Leather folders for these data sheets can be had at $2 each.

Membership Certificates.

Owing to the fact that the first twenty-five membership certificates are being auctioned at the meetings of April 9 and May 14, delay has been necessary in sending these out to members.

Patent Library.

All aeronautical patents issued in the United States are on file in the Society's office. These are available at all times. Copies of any patents can be obtained through the Society at 10 cents each.

Catalog File.

A catalog file has been inaugurated. In this will be found the catalogs, data sheets and other printed matter of aeroplane, motor and accessories' makers and dealers.

Every manufacturer is requested to keep this file complete with the latest bulletins and pamphlets of his goods.

Notice to Delinquents.

Delinquents in payment of dues are earnestly requested to place themselves in good standing at the earliest possible moment in order that they may receive the official bulletin, AERONAUTICS, semi-monthly, the membership certificates and data sheets.

S. A. E. Meeting.

The Society of Automobile Engineers extends to members of the Aeronautical Society an invitation to be present at its meeting at the Automobile Club, 239 W. 54th street, New York, Thursday evening, April 30.

The general subject of the meeting will be "The Influence of Racing on Automobile Design." Mr. Finley R. Porter, designer of the Mercer car which won the Grand Prize race, will present a critical review of the subject. The paper will be illustrated by lantern slides and motion pictures of the recent California races.

AERO CLUB PENNSYLVANIA

OFFICIAL BULLETIN

OFFICERS.

CLARENCE P. WYNNE, *President.*
JOS. A. STEINMETZ, *1st Vice-President.*
WM. D. HARRIS, *2nd Vice-President.*
GEORGE S. GASSNER, Secretary
LAURENCE MARESCH, *Treasurer.*

DIRECTORS.

Arthur T. Atherholt. Harold H. Knerr.
H. F. Bamberger. Wm. H. Sheahan.
Dr. Samuel C. Falls. Walter S. Wheeler.

Office of the Club, Bellevue-Stratford, Phila., Pa.

A stated meeting of the club was held in the Bellevue-Stratford, on Friday, April 3, at 8 p. m.

Henry Woodhouse gave a talk on "The Meaning and Influences of the Recent Developments in Aeronautics."

AERO SCIENCE BULLETIN II.

The Aero Science Club has been organized amongst college students and others to foster the art and science of aviation.

Five persons in any one vicinity may organize a branch of the Aero Science Club. Dues, $3 per year. Each member will receive one year's subscription to AERONAUTICS. In each issue will be published the bulletin of the club and the most important essays. The Greater New York branch of the Aero Science Club held its first meeting at Grand Central Palace, April 11, and the next bulletin will contain list of officers, also club emblem. The Aeronautical Society has voted to co-operate with the Aero Science Club, and meetings will be held in their rooms at the Engineers' Building, 29 W. 39th street, Saturday evenings.

Members and their friends are invited to exhibit apparatus and fly aeroplane models for prizes at the Spring Festival to be held under the auspices of the League of Political Education, Civic Forum and Economic Club. Admission, $1. Exhibitors free. The exhibition will be at the 71st Regiment Armory, 34th street and Fourth avenue, afternoons and evenings of Wednesday, Thursday and Friday, April 22, 23 and 24.

For particulars address Edward Durant, Director, Room 827 World Building, or telephone Aeronautical Society from 2 to 5 p. m., except Saturdays.

ERONAUTICS

TH WHICH IS COMBINED **FLY**

Official Organ and Bulletin—Aero Club of Pennsylvania
The Aeronautical Society

The New Benoist Flying Boat in Action

BENOIST

ANNOUNCEMENT

The Benoist School of Aviation now open at St. Petersburg, Florida. The school is under the personal supervision of Tom W. Benoist and Tony Jannus.

We also conduct the first regular schedule passenger-carrying air line in the world, St. Petersburg to Tampa, Fla.

Students who want to join the school and prospective agents who want their territory for the exclusive sale of our flying boats will do well to address

BENOIST AIR CRAFT COMPANY

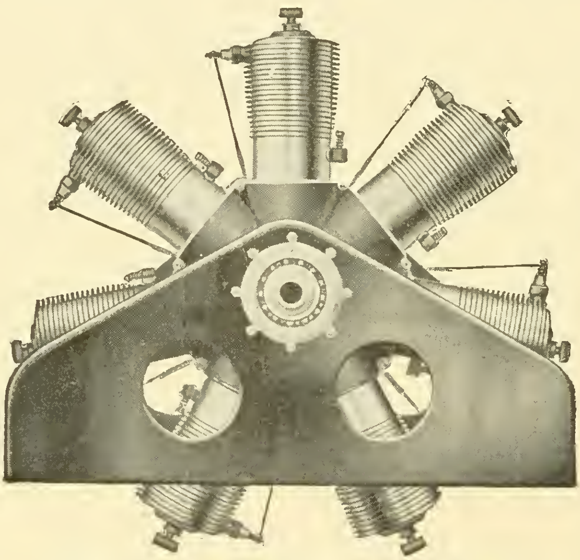
St. Louis, Missouri or St. Petersburg, Florida

---

50 H. P. 160 POUNDS

GYRO MOTOR

80 H. P. 207 POUNDS



Endurance Flying Record to Date 4 hrs., 23 min.

Built of Nickel Steel and Vanadium Steel Throughout

Send for Catalog

THE GYRO MOTOR COMPANY, 774 Girard Street, Washington, D. C.

THE NAVY BOATS AT VERA CRUZ

are equipped with

PARAGON PROPELLERS

Send for Photographs of Latest Designs

¶ The three-bladed PARAGONS used by the Navy Aviators give the highest results ever attained. The two-bladed PARAGONS are unequalled. Efficiency, Security, Satisfaction—are back of the name PARAGON—the mark of first-class equipment.

THE AMERICAN PROPELLER CO., 243-249 E. Hamburg St., Baltimore, Md.

SELECTING, MOUNTING AND MAINTAINING A POWER PLANT

A Lecture Before The Aeronautical Society, January 8, 1914.

By H. W. ASHMUSEN

The science of flying has already advanced so far that a machine that cannot fly for six hours or more is now behind the times.

Suppose you own an aeroplane, or are about to purchase or build one for which you will soon need a power plant, that can take you up for a six-hour trip or longer, then the horsepower and fuel and oil consumption, and many other things, come under consideration.

Let us say that your machine belongs to that class requiring 50 (actual 50) horsepower, with oil and fuel for a six-hour trip. Such a power plant can be had that weighs 550 pounds complete, with engine and all accessories, as well as oil and gas and tanks for six hours, with about 1½ foot square head resistance. A 75-horsepower plant may not fly you any better because there are reinforced parts to hold, in landing, a larger and heavier engine, larger tanks, and the additional fuel and oil would put the weight at least 900 pounds for a six-hour trip and, besides, one have more head resistance.

A very good showing for any aeroplane engine to make would be fuel and oil consumption of 1 pound per horsepower per hour; so, while an engine maker may state that his 100 horsepower consumes about 80 pounds per hour, perhaps it is an 80-horsepower engine or less at the speed in which it consumes that given amount. It is too bad that so many of the engine makers will overrate their engines in horsepower, rating at a speed at which they would not dare let their engines run continually for long runs.

If a maker gives you a horsepower rating, ask at what speed you get that horsepower, and then determine if your propeller would be efficient at that speed, if direct connected.

Probably the first and best step to take when ready for a power plant would be to write to several or all of the motor manufacturers and send a drawing or picture of your machine, giving as much data about your machine as you can—size, chord, camber, etc., and ask what size power plant they would recommend, what size propeller to use, size of the gasoline tank for a six-hour trip, weight of power plant complete with radiator and water (if water cooled) and all other parts; the size of radiator or any special mountings, as these add greatly to head resistance. If you can cut down 1 pound of head resistance you can carry 7 pounds of weight in its place.

All things being equal, an air-cooled engine is most assuredly the better engine for flying purposes, and I dare predict this coming season will demonstrate the air-cooled engine's superiority. An engine with stationary cylinders has many advantages over the revolving cylinder type. A thing to guard against is an engine that breaks. There have been so many engines which actually broke crank shafts, crank cases, connecting rods, cylinders, etc., etc., that a buyer must actually guard against weak engines, and it is best to examine into the different parts that make up an engine and satisfy himself that the maker is using the best of materials and hasn't left some weak point or two, as some makers do, and he should see the engine run a few hours at least, and take speed readings, and thus determine how reliable and steady the engine really is, and observe that the engine does not vibrate when mounted on a very light blocking, and that it does not throw oil all over, and that there are no compression grease cups and oil cups, for they are a nuisance. An engine with but one place to oil, the tank, with a single positive oiling system, is by far best, and an engine that will permit you to get into and examine the pistons, wrist pins, crank shaft and connecting rods in about fifteen minutes, and that in another fifteen minutes you can have together and running, will certainly save you a great deal of anxiety and time when you wish to examine a part, instead of an engine that will take you one or two days to do the same. The engine should have bearings that will accommodate both propeller and tractor type machine, or fly wheel for chain drive, and it would be an advantage if the engine could be set to run in either direction, right or left hand, in a few minutes.

Of course, the price of engines will vary considerable, as in all things, but while high-grade goods do cost more to make they pay in the end.

In mounting your power plant, try to get as near the three point suspension as you can so that the different stresses that fall on the machine, do not fall upon the engine. In some cases rigid mounting is best. If your engine has six or eight bolting lugs, it is probably because it vibrates too much or requires some assistance to strengthen the crank case. If the latter is true, then a cradle or frame of metal should be cast or built up and machined along two rails to within 4/1000 in. of being straight and parallel, and this frame should be so designed and ribbed as to not be distorted in fastening same to plane, otherwise a great pressure may be placed especially on the center bearings.

The propeller can be chain-driven to advantage if you use a high-speed engine and select a propeller for less speed. A short chain has advantage over a gear drive. With a chain you have less friction, and about half of the teeth on the sprockets are always in contact with the chain, and it is best to have an odd number of teeth on the driving sprocket (or driving gear), so that sprocket and chain (or driven gear) will ever keep changing relation. The additional weight of a fly wheel and parts will be more than compensated for in correct design. With a water-cooled engine the radiator should be mounted prominently enough to allow a free passage of air through same. Mount the tanks as near the engine as you can safely, and use large enough and strong enough piping with bends enough in it to take up expansion and contraction and vibration.

If carbureter needs frequent adjustments, it is best to arrange a rod or wire so that the same can be done from the seat, and to have a direct reading speed indicator or tachometer to tell you when your setting is best. A tachometer is also a safeguard in flying, as it indicates immediately any loss of speed.

Always, first, before every start for a run, be sure to have plenty of lubricating oil in the tank and see that it is not shut off, as more harm can come from lack of lubrication than from lack of gasoline. However, it is better that the engine starve for oil throughout all its lubricated surfaces, as it will then perhaps lose speed without damage, but if your engine has one or more places that require a squirt from the oil can, or filling up with oil or grease, don't forget them. If your engine has any exposed ball bearings, as some have, fill them full with vaseline, or, better still, house them in besides; this is to keep out moisture and grit, which would soon ruin them. When you start your engine, especially in cold weather, let is run a few minutes at slow speed to warm up. Chilled metal breaks easily.

LATEST LOOPING MACHINE.

The photograph of the aeroplane with two landing gears is that of the machine belonging to Gustav Tweer, who can land either upside

down or downside up. Pegoud is said to be building a machine of this order for his stunts.

TECHNICAL TALKS—by M. B. Sellers

AEROPLANE EFFICIENCY (Concluded)

As already stated, we can plot a curve having V for abscissas and $(\frac{V^2}{n} + 1)$ for ordinates; and by multiplying the value found on this curve for a given speed, by that speed we obtain the speed factor $V(\frac{V^2}{n} + 1)$.

In Fig. 1, the full line ordinates are for miles per hour, and the dotted ordinates for metres per second; "n" is taken as 1000 for metre seconds, a trial value which, on consideration, seems rather high. It would, therefore, favor the slower machine.

Now, I may have made some statements with which the reader does not agree, and I want to say something more in explanation. In dealing with aerofoils I have used the term efficiency for the lift ratio. And, similarly, for aeroplanes the ratio of lift to the total horizontal resistance might be termed the efficiency. In horizontal flight this resistance may be taken as the thrust of the propeller, and as one horsepower equals 375 mile-pounds per hour, we have: $T = \frac{375\ HP\ e}{V}$, "e" being efficiency of propeller for which we could assume a value. If we put $375\ H.P.e = P$ we have: $T = \frac{P}{V}$; $E = \frac{W}{D+R} = \frac{W}{T} = \frac{WV}{P}$. Here the speed factor is V. But the trouble is, this equation makes no allowance for the necessary increase of head resistance, R, with speed; it would, therefore, favor the slow machine.

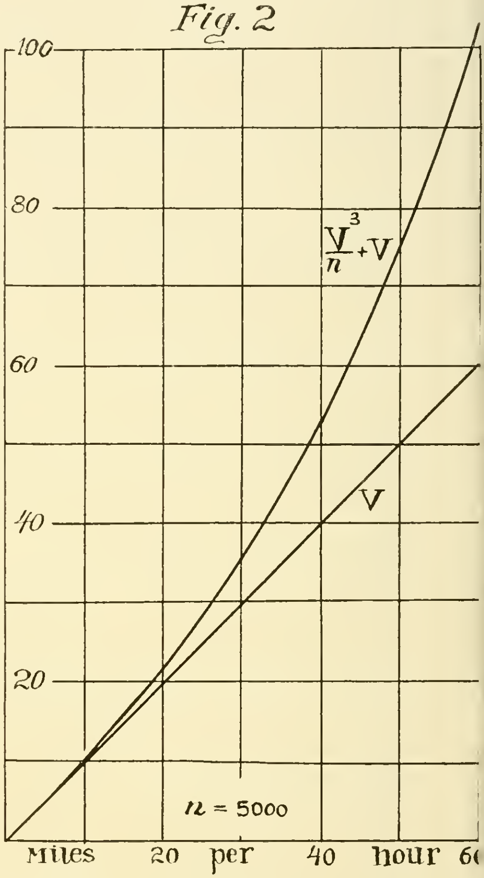
In Eiffel's work, in the calculation of full-sized machines from models, the equivalent resistance area, A, is taken as varying directly as the wing area, which, of course, is justified in that case; and, under those conditions, the efficiency expressed by $\frac{WV}{P}$ will be the same for different speeds.

But for full-sized machines, and within the limits of practice, A does not necessarily vary as the wing area, when weight is the same (the slow machine can have just as small fuselage and landing gear, and the difference due to size of wings is unimportant).

On the other hand, it is true that "A" does not vary exactly as the weight (as I have assumed it does), but this assumption is nearer the truth than the other.

It may be suggested that we assume "A" as

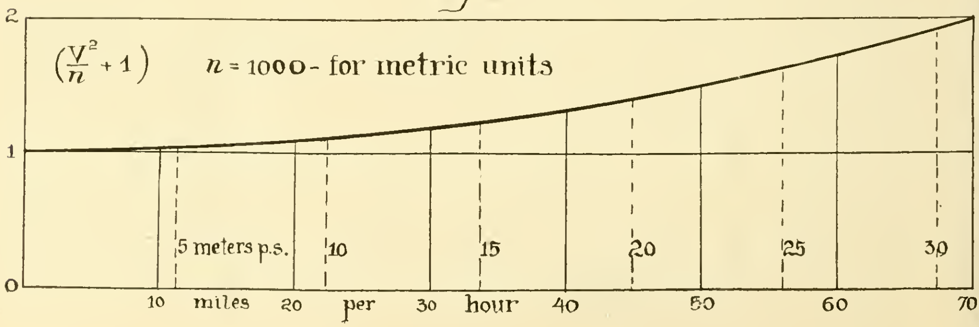
Fig. 2



constant—but this introduces other difficulties and is no nearer the truth. In Fig. 2 the speed factors V and $\frac{V^3}{n} + V$ are compared.

I shall say more on the relati n between weight and resistance at another time.

Fig. 1



ARMY TESTS FOR AEROPLANES.

The British War Office has decided to meet the wishes of private manufacturers and has agreed to test aeroplanes designed and built by the industry. The following sets out the nature and conditions of these tests, and is further interesting as it lays down the conditions which it is at present held in official quarters a military aeroplane should fulfill. It would be of advantage to American makers to have a competition such as this practically amounts to. It would prove a selling argument:

1. The Chief Inspector of Military Aeronautics is prepared, on the request of an aeroplane constructor, to put an aeroplane through the ordinary military acceptance test under the following conditions:

(i.) Examination of workmanship and materials, speed test, fast and slow, climbing, weight of load carried, rolling test, and one hour's flight. The constructor must supply the pilot and passenger. For purposes of calculation weights of pilot and passenger will be 160 lbs. each.

(ii.) Stress diagrams in duplicate for the aeroplane must be sent with or before the machine. A minimum factor of safety of 6 throughout is essential.

(iii.) No machine will be tested for military purposes unless it fulfills the conditions of one of the types used for military purposes. These are given in attached table.

(iv.) The constructor, when applying to have his machine tested, should state his reasonable expectation of the performances of the machine.

(v.) Aeroplanes submitted for test must be put through the whole of the tests unless damaged before their completion, or unless the Chief Inspector considers that the tests should be stopped for reasons of safety.

2. The Chief Inspector of Military Aeronautics is also prepared to examine and test aeroplanes which may be designed not for purely military purposes, but to demonstrate some practical or theoretical improvement in design or construction. The tests imposed in such cases will be at the discretion of the Chief Inspector.

3. Results of any test will be supplied to the constructor by the Chief Inspector, and will be kept secret, if desired by the constructor. Should the constructor wish to publish the result of the test, it is to be understood that the result should be published complete. Should only part of any report of the test be published, the Chief Inspector reserves the right to publish it in full.

4. The satisfactory performance of the tests laid down in paragraph 1 does not constitute a guarantee that the aeroplane in question will be purchased by Government.

5. These tests may be altered from time to time; notice will be given as early as possible of any alteration.

Performances Required from Various Military Types

	Light Scout	Reconnaissance Aeroplane (A)	Reconnaissance Aeroplane (B)	Fighting Aeroplane (A)	Fighting Aeroplane (B)
Tankage to give an endurance of ..	300 miles.	300 miles	200 miles.	200 miles.	300 miles.
To carry	Pilot only.	Pilot and observer plus 80 lbs. for wireless equipment.	Pilot and observer plus 80 lbs. for wireless equipment.	Pilot and gunner plus 300 lbs for gun and ammunition.	Pilot and gunner plus 100 lbs.
Range of speed ..	50 to 85 m.p.h.	45 to 75 m.p.h.	35 to 60 m.p.h.	45 to 85 m.p.h.	45 to 75 m.p.h.
To climb 3,500 feet in	5 minutes.	7 minutes.	10 minutes.	10 minutes.	8 minutes.
Miscellaneous qualities	Capable of being started by the Pilot single-handed.		To land over a 30 ft vertical obstacle and pull up within a distance of 100 yds. from that obstacle, the wind not being more than 15 m.p.h. A very good view essential.	A clear field of fire in every direction up to 30° from the line of flight.	A clear field of fire in every direction up to 30° from the line of flight.

1882

Instructional aeroplanes with an endurance of 150 miles will also be tested under special conditions; safety and ease of handling will be of first importance in this type.

ASHMUSEN LATERAL STABILITY DEVICE.

To the Editor:

During the past six years of experimenting, we have found that vertical rudders are not necessary for steering aeroplanes. Present-day types of aeroplanes can have their rudders fixed, thereby making fins or keels of them; then all that is necessary is a system for varying the head resistance at either end of wings.

The Ashmusen system consists of two small horizontal blades at each end of wings. In operating the two at one end, one pulls up and the other down to equalize the lifting and depressing effect, while the two at opposite side of 'plane remain stream-line. This system will operate for maintaining lateral balance, at offering head resistance on high side of 'plane will speed up (or present loss of speed) on low side; and it has the added advantage in that it gives automatic banking in turning, due to the added speed of 'plane furthest from center of circle being made, and without the bad skidding effect of the rudder.

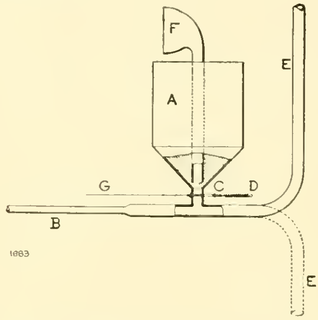
We believe this system infringes no known patents, and it is free to all to use.—Ashmusen Manufacturing Co., Motor Makers, Kings Park, N. Y.

KOUTCHINO INSTITUTE

The famous Institute Aerodynamique de Koutchino, of which Professor D. P. Riabouchinsky is director, has issued a handsome brochure on the occasion of the celebration of the tenth anniversary of the founding of the institute.

THE MEANS SMOKE SIGNAL.

The smoke signalling device for military scouts, invented by James Means, has met with more encouragement abroad, where Breguet is pushing the apparatus, than here. A commandant of the French army has reported favorably to his superiors on the usefulness of the device for signalling results of range-finding shots to concealed batteries of artillery. The dots and dashes of the code can be seen with strong glasses a distance of 5 to 10 miles when the aeroplane is crossing the line of vision. To make them visible when the aeroplane is traveling parallel to the line of vision, the nozzle is turned forward and the signals are read by the duration of the discharge. In this case the signals can not be seen at such a great distance as otherwise.



1883

The signals are given by puffs of lamp-black, large and small, corresponding to the dots and dashes of the Morse code. The puffs are made by utilizing the pressure of the exhaust of the engine. It has been made possible also to handle the exhaust of rotative motors.

A, lamp-black tank; B, exhaust pipe of flying-machine motor; C, shutter similar to the focal-plane shutter of a camera (this is normally kept shut by spring D); E, pipe (of stream line form) leading to nozzle above the upper plane, or E1 to nozzle below lower plane; F, down-blast to assist gravity feed; G, wire to operator's hand.

The first tests made in service were at Ft. Riley, in November, 1912. In October, 1911, tests were made by the Signal Corps at College Park. At this stage the signals were easily read for a mile when the machine was travelling in a direction perpendicular to the line of sight of the observer, but it was impossible to decipher them when the 'plane was sailing straight away from the observer. The inventor has corrected this error by the use of a special nozzle.

At Berlin there has been recently tried a signalling device using a reflecting mirror furnished with an electric lamp of 10,000 (?) candlepower, obtained from storage batteries. From this the light is visible during the day at a distance of about 5 miles. The complete apparatus weighs 10 pounds.

THE BLONDIN CONTROL.

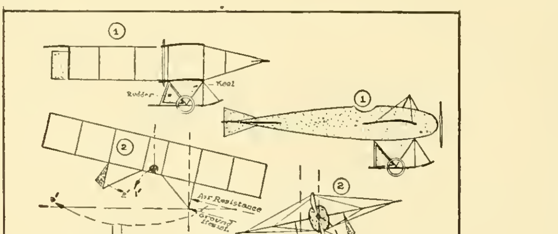
Claimed to be one of the most promising, practical and adaptable inventions designed to bring forth new, non-infringing and, perhaps, better control features to this end, is that of Joseph A. Blondin, aeronautic engineer and pilot, of Los Angeles, Cal., description of which was first published in AERONAUTICS of December, 1912.

The system embodies vertical "keel-rudders" adapted to a wide-gauge skid frame, the rudder portions of which normally form part of the keel. These rudder portions are restrained from swinging inward and operate, one at a time, only in an outward direction. (See Fig. No. 1.)

In the monoplane diagrams, Nos. 2 and 3, the machines are landing at an unbalanced angle. As soon as a skid touches ground, the machines fulcrum around that point of contact and settle as shown by the arrows. Fig. 3 shows that with customary narrow-gauge running gear (or central keel), the result would be, at least, a smashed wing. Fig. 2, having its center of gravity inside the point of contact with ground, would automatically regain balance. So much for the advantage of widely spanned skids, and consequent safe landings.

Losing lateral balance through any cause, the machine (Biplane No. 2) begins to "toboggan" in the direction of the low side. This action is resisted by a resulting air pressure against the keel and rudder on that side. Gravity (1′) then acting inside this point of resistance will tend to lower the high wing and will be aided by the operation, outward, of the keel-rudder on the high-wing side (2′). This rudder will decompose the air pressure then acting against it, in two forces: one, tending to "right" the machine through a side pressure exerted under the center of gravity of the machine (2′), and the other (3′), tending to turn the machine toward the high side, by reason of the rudder's (2′) drift resistance on that side, thus increasing the speed—and consequent lift—of the low-side wing, and restoring balance. This latter action is, in its last analysis, the sole aim and accomplishment of control elements of all existing types of aeroplanes, viz., obtaining increased lift on the low-side wing. So, in addition to this last-named power, the "Blondin system" supplies two others: one of which is automatic and, the inventor believes, capable, in itself, of restoring balance under most ordinary conditions of flight.

The system comprises the use of the usual vertical steering rudder, although it is conceivable that the latter might very well be eliminated, following a serious development of the system in question.



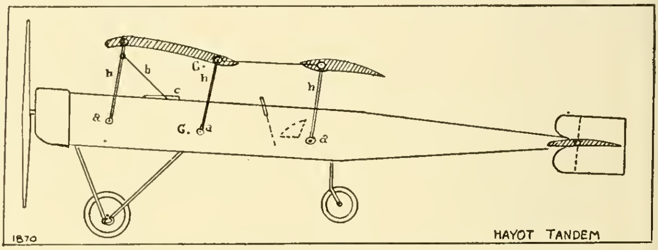
THE HAYOT AEROPLANE.

The essential features of the Hayot aeroplane are: A low c. of g., a distribution of weights, giving a large moment of inertia, and a special method of supporting the wings from the fuselage, designed to overcome the objectionable results of a low c. of g.

For small inclinations, a low center of gravity exerts little righting effort, but for large inclinations the righting effect is considerable, so that it renders an aeroplane practically non-capsizable—or, at least, if overturned, it will of itself return to its normal position. A serious objection to low c. of g. is that the machine rolls and pitches. This is lessened in the Hayot machine by the breaking effect of the tandem surfaces, and also by the attachment of the wings to be described.

When, therefore, a small inclination or perturbation occurs, the wings will move in response to it, taking up a new position of equilibrium, so that the disturbing forces may be considered as acting at the point "a"—that is, as though the machine had a normally high c. of g. But for forces such as that, because of the limited motion, the wings cannot assume this position of equilibrium, the machine acts as a low c. of g. machine. Left to itself, the machine levels up and the posts assume their normal position.

To give the aeroplane a large moment of inertia, the weights are distributed along the fuselage. In front are the motors and helix, under the rear plane the pilot and controls, and about midway between these are the passenger and fuel tank. The aeroplane is, therefore, slow to respond to an air disturbance, therefore easy to control. The tandem planes act as a brake against pitching, and the longitudinal "V" promotes stability. The machine passes from one position of equilibrium to another, under control of pilot, without oscillation; small inadvertent movements of the controls are without appreciable effect. The position of the pilot below the wings facilitates vision and helps in landing.



The Hayot machine is designed to act like a high c. of g. machine for small inclinations and perturbations, and like a low c. of g. machine for large inclinations. As seen in the illustration, there are two planes tandem, the rear one smaller and set at a smaller angle of attack than the front one, thus forming a longitudinal "V." These are supported from the fuselage by the posts "h, h, h," pivoted at both ends, so that the planes may move freely forward and backward with a (sort of) parallel motion, preserving the same inclination relative to the fuselage. This movement is, however, limited by the bar "b," the end of which slides in the guide "c," as shown.

An apparatus of this type is now under construction. Its dimensions are: Surface, 35 sq. m.; spread, 13 m., total length, 8.65 m.; weight, empty, 550 kg.; useful load, 450 kg.; power, 100; speed expected, 115 km. per hour.

NEW AIRCRAFT FABRIC.

A new fabric, which may be obtained in either cotton or linen, has been marketed by the Rose & Frank Co., of 136 West 21st St., New York. It can be had either bleached or unbleached, heavy or light weight, and is especially strong through the method of running strengthening threads throughout the fabric forming large squares. Ripping of the cloth beyond one section or square of a few inches area is prevented. It is being used in the French army and on Farman, Breguet, Bleriot, Dep and R. E. P. machines. The fabric can be had in various widths.

IN MEMORIAM.

Aero Club of Cincinnati, Aero Club of Colorado, Tufts College Aero Club, Aeronautical Society of Florida, Aero Club of Long Island, all of whose mail is returned by the Post Office; and the Pittsfield Aero Club, an affiliated club of the A. C. A., which has had no meetings for the past two years and is "as good as dead."

BLANCHARD MONOPLANE NOVEL.

The Blanchard Aerial Works of America has been incorporated to build in Omaha, Neb., a monoplane designed by James F. Blanchard, M. D., of 338½ S. Hill St., Los Angeles. The idea of the inventor is to follow the lines of the bird, applying the principles of physiology and anatomy to the mechanical structure.

Pressed steel in suitable form is substituted for the bony structure of the bird. Trussing of light steel tubing and laminated wood give a fine substitute for muscles, tendons and ligaments. Fireproof cloth, sheet steel and aluminum take the place of skin and feathers. The motor and radiator are substituted for heart and lungs; water, gasoline and the oiling system for the lymphatics and vascular system; steering wheel and controls for the nervous system. The special senses are respresented by searchlights, wireless and an efficient aviator. The flexor surfaces of the wings and tail appendages are strengthened proportionally to extensor surfaces according to the functions they have to perform. In this construction no wire is used.

Control of the machine is very simple. Ascent by pushing downward and forward of the steering wheel; descent, vice versa. Steering from right to left is accomplished by turning the wheel. Lateral balance is gained by operating a second wheel in conjunction with or independent of the steering wheel.

Landing chassis composed of two wheels and skid. Wheels are mounted on V-shaped members and suspended on twin coil springs, lying parallel with body of machine. After leaving ground, wheels can be folded upward and inward, disappearing through apertures in the body of the machine which are closed by sliding doors. Folding of wheels is accomplished by worm gears operated by the feet of the aviator.

Two three-bladed geared down propellers are used, mounted on the entering edge of main planes, five and one-half feet from sides of fuselage.

The seat of the observation officer can be turned from side to side or raised and lowered similar to a piano stool. This method of mounting the seat affords a wide scope of vision. The machine gun of demountable form, which may be raised and lowered or turned from side to side, is mounted on the cowl directly in front of the observation officer. Two port holes are built in the bottom of the fuselage just below the pilot and observation officer. Bombs may be dropped, the machine gun fired, and pictures taken through them. Port holes can be closed with sliding steel doors. The machine is to be fitted with wireless outfit, searchlights and rain-vision windshield. Gas and oil tanks are mounted between pilot and motor over the center of pressure according to standard practice. Rubber rope or chain is used to transmit the power from the motor to the propellers. Air cushions are used to upholster the seats and cockpit of the fuselage.

AERIAL MARKSMANSHIP.

A rapid fire gun has been developed by the Hotchkiss firm which fires 100 shots in 9 seconds, and the tests made show that at a distance varying between 500 and 1,200 metres, 20 to 50 hits can be made on an aeroplane flying at a speed of 60 miles an hour. This is at a stationary target. It is figured that with the gun stationary and the target moving, assuming a dirigible of 20,000 cubic metres capacity, a greater percentage of hits would be made. Three hundred hits on a dirigible would make 600 holes, going through the envelope, which would cause a loss of gas of 1,200 c.m. per hour. This would not involve an immediate fall, but would necessitate quick landing. The great trouble is in estimating the distance between two aerial combatants, and the solution is considered to be in very rapid and continuous firing. If the aeroplane is at a distance of 2,500 metres and the balloon estimates the range as 2,000, in 1 minute the aeroplane would advance 1,500 metres. Owing to the difference in bulk, the dirigible would be at a disadvantage.

S. P. VAPORIZER AND GAS SAVER.

There has been placed on the market by the S. P. Vaporizer Co., 125 East 23d St., New York, a device to prevent backfires into the carburetor and to break up the mixture for better burning. The device consists of a double wire gauze screen, dome shaped, with a button of absorbent material between the two screens in the center. The screens are imbedded in a sheet lead gasket adapted to fit between the flanges of the manifold and the carburetor. These prevent any flame from shooting out of the carburetor and setting a fire. The device works on the principle of the Davy safety mine lamp, in that a flame will not pass through a wire gauze screen that is kept cool. By breaking up the particles of gas, a better mixture is claimed and a saving of fuel to the extent of 25 per cent.

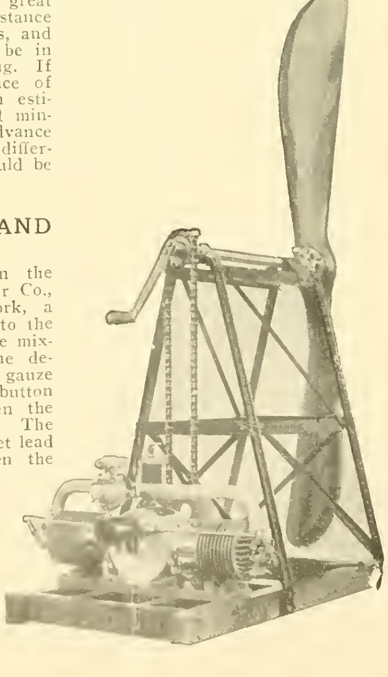
KEMP BOAT OUTFIT.

Inquiries for air power plants for small hydros and canoes will be interested in the special outfit of the Kemp Machine Works, all complete on one base and ready to be bolted to a boat or even a sled or auto. The outfit includes a Kemp 2-cylinder, 16-h.p. motor, mounted on a hardwood base 24 by 42 in.

All the purchaser has to do is to bore six holes at suitable points in this base, bolt to his boat or sled, connect up the gasoline tank, and turn the starting crank. Height from top of base to center of propeller shaft is 3 ft. The diameter of the propeller is, in most cases, 6 ft. However, propellers best suited to the individual machine are supplied, and diameter may vary somewhat from 6 ft., with corresponding change in pitch. The weight of the entire outfit complete is 156 lbs.

The motor is of standard 4-cycle type, 4-in. bore and stroke. Cylinders are semi-steel, with flanges turned from the solid stock, insuring uniformity and equal expansion with efficient cooling. The natural draft of the propeller will cool the motor perfectly under any conditions, it is claimed. On boats some shelter from the sun should be provided over motor. The Schebler carburetor and Rhoades unit spark system are standard equipment.

The price of the complete outfit, including motor, propeller, countershaft, chain drive, starting crank, and everything shown in cut, together with coil and batteries, is $265 net, f. o. b. cars Muncie.



MILITARY AERONAUTICS.

San Diego, Cal., April 26.—Capt. Cowan, Commander of the First Aero Corps, received orders to-day to dispatch from the Government aviation camps to Galveston five Government aviators, thirty enlisted men and three army aeroplanes. The aviators who will go to Galveston are Lieuts. Milling, Taliaferro, Fallois, Carberry and Dodd.

Captain Arthur S. Cowan, in charge of the army aviation work at San Diego, has received orders to be prepared with the five machines now in service in the army in view of the present activities in Mexico. The equipment includes four Burgess tractors, Renault 70 engines, and a Curtiss tractor with 100 h.p. Curtiss motor. In Captain Cowan's command are 10 certified military aviators, 3 more who are capable of flight but who have not received the title of military aviator, and 86 men in the aviation detachment.

The Burgess Co., the Wright and Curtiss companies have received orders to be prepared to turn out machines at quick notice. Two of the Dunne type are already on hand at Marblehead available for use. It is not known which type the government will order, should occasion arise. A Wright tractor, with 100 h.p. Daimler engine, will be delivered to the army shortly from Dayton, this having been ordered a long time ago, as is well known.

The govermnent has also been offered the services of the 44 aviators —members of the U. S. Aviation Reserve, composed of practical civilian flyers from all over the country, organized by A. B. Lambert of St. Louis. The aeroplane companies have offered their shop facilities and equipment. Should aeroplanes be needed in the event of a war with Mexico, it is likely that the principal concerns will have their hands full to fill orders.

As the government can not accept private offers of aeroplanes and material without payment therefor, it is probable that considerable money will be spent in the trade. Foreign or native infringing machines can be used by the government under the rule of eminent domain, payment for damages to be awarded by a court of appraisers. (See AERONAUTICS, page 74, March 15.)

The national guard of California is to have an aero department. Roy Francis, a San Francisco aviator, has been appointed a first lieutenant to establish a flying machine service. The new corps will begin operation with a double tractor biplane, which Francis has tried out.

$250,000 AGAIN.

The $50,000 which was put back in the aviation appropriation by the Senate has been cut out in the conference, leaving the amount $250,000.

The flights at the S. C. A. S., San Diego, for the two weeks ending April 11, 1914, were:

Total number of flights, 85; total time in the air, 23 hours, 8 minutes; passengers carried, 42.

Summary, January 1 to April 11, 1914: Total number of flights, 876; total time in the air, 230 hours, 50½ minutes; passengers carried, 429.

DIRECTING ARTILLERY FIRE FROM 'PLANES.

In trials made by the artillery at Fort Riley, in connection with aeroplanes for the purpose of testing their adaptability in getting ranges and reporting results of firing, a card system was successfully employed by the aviators, Milling and Arnold, and their passenger observers.

Cards about nine inches square, of pasteboard and of various colors —red, green and white—were used. Attached to each card was a wagon nut, fastened on by a piece of wire attached to a corner of the card. Before dropping, each card was bent into an "S" shape, so that it rotated in falling, ensuring it being seen from any angle. After a little practice the aviator became quite expert in dropping these cards close to the battery, although at first some of them went quite wide of the mark, and on the first day two of them hung in the wires of the machine and did not drop. This latter difficulty was remedied by fastening a joint of stovepipe to the machine, through which the cards dropped to a point below, where they could not become entangled in the wires. The card had marked on it a series of parellel lines, which were supposed to aid the observer to indicate the amount over or short. It was found, however, that a plain card was more satisfactory, the measurements of the amount over or short being shown in terms of the bracket laid down on the ground. The white cards were difficult to see. The red and green were much more visible, and there was little difference between them.

The system of signaling from the aeroplanes by means of making a short turn to right or left was pronounced by the aviators to be impracticable, and was, therefore, abandoned.

De Lloyd Thompson is now looping the loop in Los Angeles with a Day tractor, Hall-Scott motor.

NAVAL AIRCRAFT SEARCH VERA CRUZ HARBOR.

Vera Cruz, April 26.—Lieut. Bellenger reconnoitered the San Francisco railroad bridge about 25 miles inland. Both he and Ensign Stolz were up 40 and 50 minutes, respectively, soaring over and around Vera Cruz. Admiral Fletcher reported:

"That at Boca and Antigua he discovered seven soldiers, but had found Antigua bridge intact. Railroad is blown up for 200 yards on each side of the bridge. No soldiers were seen in the vicinity of Falmoral. Fires along railroad track to Jalapa. South of Vera Cruz the aeronaut saw the railroad bridges at Rico Moreno, on road to water works, burning and also two bridges at Boca del Rico. Sighted Tejar. Saw no soldiers south of Vera Cruz."

The battleship Mississippi landed marines on April 26 at Vera Cruz and two flying boats made scouting flights over the city and about the harbor seeking mines in the clear waters and looking for the Mexican federal troops said to be encamped some miles from Vera Cruz.

A communication from Lt. Comdr. Mustin, U. S. N., commanding the U. S. S. Mississippi, shows the mobility and characteristic alertness of the Navy Aeronautic Service when acting under emergency orders.

The Mississippi has been in service as an aeronautic experiment ship at Pensacola since the designation of that abandoned Navy Yard as the U. S. Navy Aeronautic Station and the chief interest of her officers and men, so far, has been in getting shops, sheds, hangars and all aeroplane paraphernalia in good shape for carrying on the work of instruction and experimentation.

On Sunday, April 19th, about 12:30 P. M., a radio message was received to transfer a section of the Aeroplane Squadron to the U. S. S. Birmingham. Two hydro-aeroplanes with a power boat, aeroplane stores, spare parts and a compliment of officers and men for operation afloat or ashore was transferred at once. One of the Mississippi's lower booms was rigged on the Birmingham for hoisting the machines out and in and by 8 P. M. the outfit was all assembled and ready for transfer. At 6:30 A. M. next morning the Birmingham went alongside of the dock and received the outfit and left soon after with Lieut. J. H. Towers, U. S. N., in charge of this, the First Aeroplane Section.

The Mississippi left soon after with two more hydro-aeroplanes and the Second Aeroplane Section and a suitable outfit to join the fleet.

First Lieut. McIlvaine, U. S. M. C., has been left in charge of the remaining outfits, at Pensacola, with 23 men and 7 marines.

This evidence of flexibility in the as yet embryonic aeronautic organization of the navy, is encouraging as the sudden orders were not anticipated and the outfits used are not the latest developments which is one of the chief aims of the new station to test and perfect.

News In General

NILES FLIES 11,000 FEET WITH NEW MOISANT—LOOPS THE LOOP.

After demonstrating the standard 'oisant 50 Gnome monoplane of the "luebird" type designed by Kant-er similar to the machine used by 'ood in his flight to Washington, 1 April 19, making complete loops, il dives and sidewise turns, Niles ok out the new Kantner machine 1 the 21st and flew it to 11,000 et, qualifying for the 8,000 foot st demanded by the Carranza gent, W. A. Staats, who purchased ie machine after the flight. This the second to have been purchased the rebel leader and a third to be delivered shortly. Kantner mself took up Staats later for 15 inutes to 1,500 feet, at which point ie machine, painted a dull gray, as almost invisible. The new ma-iine resembles a Morane-Saulnier, ith a modified Bleriot type run-ing gear. Witnesses call it the nest looking monoplane seen in iese parts. The engine is an 80 nome.

On April 24 Niles again cut capers in the air with the new Moisant. This machine and the other new one of this type in the works have been offered to the U. S. War Department. Huerta is said to have three Moisant monoplanes, all of which have been reported as destroyed by a storm. Villa had one Curtiss type biplane and a Moisant monoplane. The new one just demonstrated and the one in the works intended for the Constitutionalists cannot now be delivered on account of the embargo and the deposits made will be held subject to possible future delivery. To deliver these during the course of a war, of course, would be criminal and the penalty is death.

Huerta has three aviators among its federal forces, all trained at Hempstead, where they passed tests for pilot's certificates little more than a year ago. They are Lieutenants Juan P. Aldasoro, Eduardo Aldasoro and Horacio Ruiz.

FEBRUARY IMPORTS AND EXPORTS.

Imports—none during February. or 8 months imports totaled $26,233 or parts. Same period 1913, $51,-96.

Exports of Domestic Make—4 eroplanes and parts, valued at 21,466. For 8 months, total was 8 and parts, value $90,585. Fig-ires for same period last year, 9,944 and $89,097 respectively.

Exports of Foreign—None. For months ending February, 1 and arts, at $4,949. Same period last ear, 9 and parts, $49,442.

In Warehouse—None. On Feb-uary 28, 1913, there were 4, valued t $13,884.

Gilpatric's pilot "license" has been uspended for 4 months as a penalty or flying over New York City.

NEW INCORPORATIONS

Lincoln Beachey, Inc., of Chi-ago: capital stock, $2,500, for pro-notions of exhibition flying, racing, tc. Robert Frankel, William H. "Bill" Pickens and Albert G. Long.

Canadian Aviation Co., Ltd., To-onto, Can., $50,000, for the purpose of manufacturing, teaching, selling, xhibitions, etc. William A. Dean is eading director.

Atlantic Aerial Navigation Co., Camden, N. J., $125,000. Kenneth and Donald Robertson and James McCutcheon.

The Hydro Airship Co. is putting up a building 100 by 128 ft. at West 21st St. and Surf Ave., Brooklyn, at a cost of $3,000.

INTERNATIONAL AERONAUTICAL CONGRESS.

An International Aeronautical Congress has been organized for the purpose of holding a meeting during the Panama-Pacific Exposition in 1915, at which papers will be read, tests made if possible, etc., conducted along the same line as the two previous congresses held in Chicago in 1893 and in New York in 1907. Those interested may join upon the payment of $5, and will receive a bound volume containing the proceedings, admittance to the meetings, and other privileges.

A meeting of the organizers will be held June 10 in New York. The office of the Congress is 29 West 39th street, New York.

Scientific organizations from all over the world have been invited to send delegates, and men of note in aeronautics from every part of the world will be officers and committeemen.

TO LESSEN SKIN FRICTION.

From tests for skin friction recently made by MM. Maurant and Moismont, it is learned that the friction of the air on a well varnished aeroplane fabric is about the same as that on polished steel, but that on the ordinary yellow balloon fabric is greater by 70 per cent. The increase in the resistance relatively to the increase in speed is not uniform.

THE BENOIST AIR LINE.

In the entire season of three months the Airboat Line was laid up only four days because of mechanical troubles. As the operation called for 84 miles a day and as there were numerous other flights each day for the few machines employed the total mileage for the two machines ran up to 11,000 miles and both machines now stand overhauled and in good shape for the season's exhibition and passenger carrying work. All told some 1,205 passengers were carried, some two at a time, and the amount of powerful advertising resulting from the diversity of places these passengers hailed from is without doubt great. The express business amounted to comparatively little in tonnage, but was very valuable.

All told the repairs for motors and planes did not quite reach the $100 mark and, aside from having to replace one radiator, none of the equipment showed any inadequacy for semi-tropical conditions. As all the motors used were old Roberts sixes it is not unreasonable that a small amount of replacement should be necessary. Most of these repairs were confined to piston rings and a few small ball-bearings and on the old-style motors to spiral gears that wore out.

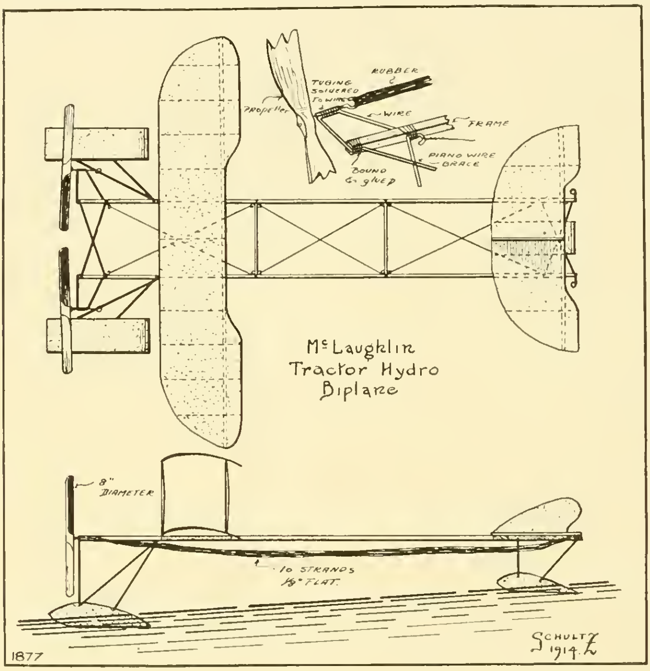
Send for the new brochure number 20, just issued by the Benoist Aircraft Co., St. Louis.

THE McLAUGHLIN TRACTOR HYDRO.

By Harry G. Schultz, *Model Editor.*

The model shown in the accompanying drawing was constructed by George F. McLaughlin of Brooklyn, N. Y., one of the most enthusiastic members of the "Aero Science Club." This model is of high finish and construction and ought to be a very successful flyer.

Frame.—The two 30-in. main sticks for the frame are cut from 3/16-in. x ½-in. spruce, tapered to about 3/16 in. x ¼ in. in the ends. Braces of light piano wire hold the main sticks 4 in. apart. These braces are formed (as shown on drawing) at one end for the propeller bearing and at the rear of the machine for the hooks for rubber. Two intermediate braces of spruce or bamboo are placed between the main sticks at regular intervals and the frame guyed with light steel wire. The bearings project 2 in. beyond the frame at each side, making a total distance of 8 in. between bearings. The bearing for propeller is but a piece of brass tube soldered along the piano wire braces. Care should be taken that the bearing is in line with the hooks for rubber at the rear of machine. The brace at rear of the frame is arranged to permit the hooks for rubber to project 1 in. beyond the frame at each side, making a total distance of 6 in. between the hooks. The span of the main planes is 24 in. and the chord 5 in. except at the center where it is 4 in. (shown on drawing). Both spars and ribs are of bamboo. Curved and rear edges of planes may be made with light piano wire. It is desirable to use heavy bamboo paper coated with varnish for the wing covering. Eight struts each 4½ in. in length, are employed between the planes, these are cut stream line, from 3/32 in. x ¼ in. spruce, tapering



from the middle along the rear edge down to about 3/32 in. round at the ends. Four struts are placed between the planes immediately over the main frame, and two struts 6 in. from these at each side. Light steel wire is guyed between the struts.

Rear Plane.—This plane or tail is flat, greatest length 12 in.; width at center 4 in.; bamboo ribs 2 in. apart. A fin or rudder of aluminum is attached to the tail as shown on the drawing.

Pontoons.—The method of pontoon construction is original with this constructor, the pontoons being constructed as follows: These pontoons are made from cardboard (about the thickness of an ordinary business card) to the shape shown, and dimensions given, and cement the parts together with ambroid. Cardboard pontoons keep their shape and are not as heavy as one may imagine and it is possible to form the cardboard into all sorts of shapes not possible by other means of construction. Model builders attach two much importance on having pontoons as light as possible, not taking into consideration the loss of efficiency when the pontoons are warped out of shape, and not considering the damaging effect on the pontoons when a hard landing is sometimes made on the earth. The cardboard pontoons were designed to eliminate as far as possible these defects. Three pontoons of same size are used, two at forward end of machine and one at the rear, below the tail. Greatest depth of pontoon, 1⅜ in.; greatest length, 4½ in.; uniform width 1½ in. A coat of varnish will make them waterproof and another coat of aluminum paint will improve the appearance. Two aluminum tubes, 1/16 in., 1¾ in. long are run through the tops of each of the pontoons for attachment to the frame. Where the tubes enter the pontoons, ambroid will keep out the water. Light piano wire is used for bracing and attaching the pontoons. Solder is used to connect the wires. Attachment is made to pontoons by running the wire through the aluminum tubes.

Rubber.—Fifty feet of flat rubber is used, divided into 10 strands on each side, each 2½ ft. long. Depending on material used, which regulates the weight of the machine it may be found less rubber than this will do.

Propellers.—Two 8 in. propellers are used. Carved or bent wood. These are attached to bearings so that in case of breakage they can be easily replaced. Keep plenty of oil on the bearings, etc., to prevent the rust.

Model Notes.

Under the auspices of the "Aero Science Club" an excellent exhibition of model aeroplanes, gliders and full sized machines was held at the 71st Regiment Armory, on April 22nd, 23rd, and 24th, in connection with the "Spring Festival." The models were all highly finished and of excellent workmanship.

Among the models exhibited were a tractor hydro-biplane of excellent workmanship by George F. McLaughlin; a speedy distance and altitude flyer by George B. Post, a model glider by Frank Schober, world's record hydro and "controlability of flight" models by George A. Cavanagh, and R. O. G. model by Andrew Surini and "Wading River" racers by Harry Schultz and George Bauer.

Much interest was also evidenced in the model "Oscillators" demonstrated by Mr. Blomquist and he was recipient of many inquiries regarding the same.

The full-sized machines exhibited consisted of the Sloane No. 50 h.p. Deperdussin monoplane flown over New York City by Gilpatric on April 14th, the Schmitt military monoplane, and a diminutive monoplane of excellent construction by Harry Herzog and Cortlandt S. Parker The machines attracted much attention and the exhibition was a great success in every way.

The Philadelphia Model Aero Club fast progressing. The little magine published by this club and own as the "Model Aero Quar-ly" is growing rapidly both in :e and quality. It is edited by illiam J. Hewitt, the able secrery of the club, and deals with odels, records, notes and any her matters of interest to the odel enthusiasts. Altogether it is very interesting little brochure.

AERO SCIENCE CLUB BULLETIN III.

The last few meetings of the \ero Science Club" have been a eat success. They were well atnded and the club is rapidly beming a strong organization.

At the first meeting, held on April 4th, the officers were elected as follows:

Charles V. Obst, president; George Bauer, vice-president; Frank Schober, 2nd vice-president; George A. Cavanagh, 3rd vice-president; Harry G. Schultz, secretary; Andrew Surini, librarian.

Arrangements have been made for an intercity model flying contest to be held on May 30th, 1914, at Church Ave. and 91st St., Brooklyn, N. Y. Five medals have been offered as prizes and there is a likelihood of more prizes being offered. The contests are for duration from the hand and duration rising from the ground. These contests are open to every one. No admittance fee is charged. A cordial invitation to attend and compete is hereby extended to the Philadelphia Model Aero Club, the Boston, Schenectady and other model flyers.

Any flyers having intentions of entering please notify Harry Schultz, secretary Aero Science Club, 23 West 106th St., New York City, N. Y.

THE AERONAUTICAL SOCIETY

29 West 39th Street, New York

OFFICIAL BULLETIN.

Next General Meeting.

The next general meeting will be held May 14. It is expected that George Clifton will deliver his postponed lecture on "Aerial Photography" at this meeting. The evening will also be devoted to late developments in aeronautics as portrayed by lantern pictures of new aircraft and accessories, with a popular series of pictures of general aeronautic interest. The next scheduled meeting thereafter will be held on June 11.

New Members.

George Rudlott, 365 West 56th street, New York; J. C. Cadegan, M.D., Glace Bay, N. S.; A. P. Brooks, N. Y. Athletic Club; Otto Bennekamper, 2071 7th avenue, New York; L. R. Hunt, 179 Clinton place, Newark, N. J.

Data Sheets.

The first of the data sheets have been sent out. These cover strengths of wire and cable, horsepower formulae and charts, formula for calculating length of chain, horsepower table, table of decimal equivalents, metric system equivalents, airhole formula and table of lifting power of gases. The following manufacturing companies have kindly co-operated and have supplied data sheets of the same standard size covering their materials:

Hess-Bright Mfg. Co.
New Departure Mfg. Co.

Other companies which have agreed to furnish data sheets are:

Standard Roller Bearing Co.
Bosch Magneto Co.
Whitney Mfg. Co.
Gray & Davis.
National Tube Co.
Edison Lamp Works.
Lavigne Mfg. Co.
Bower Roller Bearing Co.
Hyatt Roller Bearing Co.

Leather loose-leaf books may be had for binding these data sheets at $2, provided a number of orders can be secured at one time.

The data sheets are issued free to members as fast as they can be prepared.

Membership dues in The Aeronautical Society are $10 a year, no initiation fee. Members receive data sheets, the magazine, AERONAUTICS, engraved certificate of membership, free monthly lectures. For further information address the Secretary.

Dinner.

An informal dinner, held on April 16, was attended by 70 members and guests. The speakers were: Hudson Maxim; Orrel A. Parker, toastmaster; Captain Thos. S. Baldwin, Leo Stevens, Walter L. Brock. A most enjoyable time was had by all present. It was voted a success, and it is urged that these informal dinners be held at frequent intervals.

AERO CLUB PENNSYLVANIA

OFFICIAL BULLETIN

OFFICERS.

Clarence P. Wynne, *President.*
Jos. A. Steinmetz, *1st Vice-President.*
Wm. D. Harris, *2nd Vice-President.*
George S. Gassner, Secretary
Laurence Maresch, *Treasurer.*

DIRECTORS.

Arthur T. Atherholt.	Harold H. Knerr.
H. F. Bamberger.	Wm. H. Sheahan.
Dr. Samuel C. Falls.	Walter S. Wheeler.

Office of the Club, Bellevue-Stratford, Phila., Pa.

The general meeting of the Aero Club of Pennsylvania, held at the Franklin Institute on March 26, 1914, proved to be a particularly successful meeting due to the very interesting paper read by Colonel Samuel Reber, U. S. A., during his lecture on "Recent Progress in Military Aeronautics." Colonel Reber covered the field very fully, not only during the course of the reading of his paper, but while showing many interesting lantern slides which covered aviation in the foreign countries as well as at home, and his paper likewise took up the development abroad as well as here.

The meeting of the club on Friday evening, April 3, was addressed by Henry Woodhouse, editor of "Flying," who chose for his subject "The Meaning and Influence of the Recent Developments in Aeronautics." As Mr. Woodhouse is, perhaps, one of the best informed men on the subject of aeronautics in America, his talk was particularly instructive as well as interesting, and many points showing the great development from scientific, commercial and sporting standpoints were brought out by him. At the end of his talk, Mr. Woodhouse suggested in connection with the "Around the World Race" that a machine be entered in the name of the city of Philadelphia, which would prove a far-reaching advertising advantage due to the publicity that it would bring forth.

Mr. Wynne, the president of the club, took up the subject enthusiastically and a movement is on foot to raise $50,000 for this purpose, the thought being that $35,000 would be required to manufacture, equip a maintain the machine and extra pa in the race, while the additio $15,000 should be offered as pri of events centering in Philadelp during the course of the race. It the intention of those in charge this project to make their entry the race conditional upon the offic of the race agreeing to change route so that Philadelphia will one of the control points and suggestion has been made that order to make it a State as well a city enterprise, that some of money be used in offering pri for the fastest time made across State of Pennsylvania, say fr Pittsburgh to Philadelphia.

The matter is to be taken up w the various trade and business me organizations and for that rea the president of the club is to point a committee to have charge all such negotiations.

The next meeting of the club w be held on Friday evening, May at the Bellevue Stratford, at wh time it is expected that the ent tainment committee will have prominent speaker to address members, and as this is the l meeting of this character until af the summer recess, it is expec that there will be a large tendance.

The ballooning season will o during the last week of April a as many engagements have alre been made for the use of the b loon, it is expected that great terest will be taken in this sp during the coming season.

Catalog File.

A catalog file has been inaugurated. In this will be found the catalogs, data sheets and other printed matter of aeroplane, motor and accessories' makers and dealers.

Every manufacturer is requested to keep this file complete with the latest bulletins and pamphlets of his goods.

LEO STEVENS IN TH AIR.

A. Leo Stevens piloted a mov picture person from New Roch to Brookville, L. I., on April after rescuing the young lady in thrilling movement from the r of a building where she had be entrapped by wily masculine perso "Doctor Churick" reports the f most satisfactory.

AERONAUTICS

Combined with "FLY"

blished semi-monthly in the best interests of Aeronautics

BY

AERONAUTICS PRESS INC.
250 West 54th Street
New York
Telephone, Columbus 8721
Cable, Aeronautics, New York

RNEST L. JONES — Editor
B. SELLERS, — Technical Editor
ARRY SCHULTZ, — Model Editor
A. BEIER, — Advertising

itered as Second Class Mail Matter, September 22, 08, under the Act of March 3, 1879. $3.00 a year, cents a Copy.

stage free in the United States, Hawaii, the Philipnes and Porto Rico. 25 Cents extra for Canada d Mexico. 50 Cents extra for all other countries.

e magazine is issued on the 15th and 30th of each onth. All copy must be received 6 days before te of publication. If proof is to be shown, allowce must be made for receipt and return.

ake all checks and money orders free of exchange d payable to AERONAUTICS PRESS.

ibscribers will kindly notify this office if disconuance is desired at the end of their subscription riod, otherwise it will be assumed that their subription is to be continued.

AERO ENGINEERING DATA

TABLE OF DECIMAL EQUIVALENTS

8ths, 16ths, 32ds, 64ths of an inch

8ths.

1/8 = .125
1/4 = .250
3/8 = .375
1/2 = .500
5/8 = .625
3/4 = .750
7/8 = .875

16ths.

1/16 = .0625
3/16 = .1875
5/16 = .3125
7/16 = .4375
9/16 = .5625
11/16 = .6875
13/16 = .8125
15/16 = .9375

32ds.

1/32 = .03125
3/32 = .09375
5/32 = .15625
7/32 = .21875
9/32 = .28125
11/32 = .34375
13/32 = .40625
15/32 = .46875
17/32 = 53125
19/32 = .59375
21/32 = .65625
23/32 = .71875
25/32 = .78125
27/32 = .84375
29/32 = .90625
31/32 = .96875

64ths.

1/64 = .015625
3/64 = .046875
5/64 = .078125
7/64 = .109375
9/64 = .140625
11/64 = .171875
13/64 = .203125
15/64 = .234375
17/64 = .265625
19/64 = .296875
21/64 = .328125
23/64 = .359375
25/64 = .390625
27/64 = .421875
29/64 = .453125
31/64 = .484375
33/64 = .515625
35/64 = .546875
37/64 = .578125
39/64 = .609375
41/64 = .640625
43/64 = .671875
45/64 = .703125
47/64 = .734375
49/64 = .765625
51/64 = .796875
53/64 = .828125
55/64 = .859375
57/64 = .890625
59/64 = .921875
61/64 = .953125
63/64 = .984375

GUY WIRE AND CABLE DATA.

Aeronautical cord consists of a number (usually 19) of fine wires of great strength stranded together. It is furnished in five diameters, with a minimum thickness of 1/32" and a maximum of 1/8". The strengths of the different sizes run, approximately from 200 tc 2,300 pounds.

For steering gear a more flexible cord is provided. This is composed of six strands of seven wires each, with a center of either cotton or wire, as ordered. The cord with the cotton center is considered more pliable than that with the center composed of wire.

The standard sizes for the flexible cord are 1/16", 3/32" and 1/8", other sizes being made to order.

Wire differs from cord in that it consists of a single wire instead of a number of wires twisted together. Like the wires in the cord, it is made from the highest grade of steel and given a plated finish that secures best results in soldering. This wire is made in 12 sizes. Care should be taken by users to make good connections, so that the entire strength of the steel can be developed. The following tables (Roebling) give information as to strength and weights:

GALVANIZED AVIATOR CORD

Diameter.	No. of Wires.	Approximate breaking strength in pounds.	Weight in pounds per 100 feet.
1/4"	19	8,300	13.80
3/16"	19	3,500	7.20
5/32"	19	3,000	5.50
1/8"	19	2,300	3.60
7/64"	19	1,465	2.80
3/32"	19	800	2.00
1/16"	19	500	0.96
1/32"	7	200	0.35

EXTRA FLEXIBLE GALVANIZED AVIATOR COR

6 x 7 Cotton Center.

Size.	Approximate breaking strength in pounds.	Weight in pounds per 100 feet.
3/16"	3,000	5.35
1/8"	1,015	2.35
3/32"	780	1.50
1/16"	420	.84

6 x 7 Wire Center.

Size.	Approximate breaking strength in pounds.	Weight in pounds per 100 feet.
3/16"	3,200	6.15
1/8"	1,235	2.65
3/32"	930	1.70
1/16"	530	1.03

SPECIAL HIGH STRENGTH PLATED AVIATOR WI

No. B. & S. Gauge.	Diameter.	Approximate breaking strength in pounds.	Weight in pounds per 100 feet.
10	.102	2,000	2.91
11	.091	1,620	2.27
12	.081	1,300	1.82
13	.072	1,040	1.45
14	.064	830	1.13
15	.057	685	.891
16	051	540	.718
17	.045	425	.555
18	.040	340	.436
19	.036	280	.355
20	.032	225	.264
21	.028	175	.227

ADVERTISING TALKS—IV.

Does the trade have on its mailing list for semi-monthly distribution the names of commanding officers, heads of departments, chief aviators, school instructors, official librarians, etc., in the armies, navies and governmental branches of the United States, Italy, France, Austria, England, Japan, Russia, Greece, Be gium, etc.?

Through the reading and advertising pag of AERONAUTICS all these are reached wi unbiased information, and for less than would cost the advertiser for printing ar postage on his own circular matter.

Aeronaut Leo Stevens

Leading Balloon Builder of the World

Balloons

to carry One to Fifty Passengers

Leading Sportsmen use a Stevens Outfit

AIRSHIPS, AEROPLANES AND BALLOONS OF EVERY DESCRIPTION

USED BY NINETY-FIVE PER CENT. OF THE CLUBS IN THIS COUNTRY AND CANADA

GAS GENERATORS, PARACHUTES, SAFETY-PACKS

If It's in the Aerial Line, Let Me Estimate

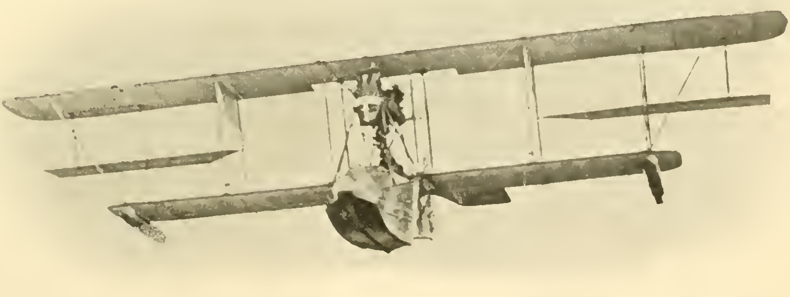
Box 181, Mad. Sq., New York

VOL. XIV. No. 9 MAY 15, 1914 15 Cents

AERONAUTICS

WITH WHICH IS COMBINED FLY

Official Organ and Bulletin—Aero Club of Pennsylvania
The Aeronautical Society



TECHNICAL TALKS—By M. B. Sellers

Lift and Drift of a Full-Sized Aeroplane Wing Compared With That of a Model

n applying his results obtained with models the calculation of full-sized aeroplane ıgs, M. Eiffel augmented the values K_x .1 K_y by 10%, because the value K_{90}, which s .072 for a square plate with the area of : model, tended toward .080 with increasing e of plate.

The bulletin of the Aerodynamic Institute the University of Paris (Part III) de- ibes some tests of full-sized aeroplane sur- es, made by means of the "electric chariot." ıe values obtained with three of these sur- es are compared with those found by M. ffel for models one-tenth of their lineal nensions. Surface no. 1 was flat, top and ttom, but the top was sloped to the leading 1 trailing edges; nos. 2 and 3 were arched › and bottom.

t was found that the plotted curves for the essures K_x and K_y had the same general nd as those for the models. The lifts, K_y, re greater throughout for the full-sized faces in every case, the difference varying ›m 0% to about 15%. A comparison of the ifts, however, did not show a common ergence. The drift for the no. 1 was greater than that for the model, especially around 3°, where the values for the model appeared remarkably low. For the surfaces nos. 2 and 3 the drifts were generally higher for the models.

On account of the small pressures measured, in the case of the drift, the results are less accurate than those for the lift; also, the unavoidable irregularities in large surfaces, as compared with the models, would presumably affect chiefly the drift. The authors conclude that it is, therefore, hard to determine whether each divergence in the results can justly be attributed to the method of measurement.

In some more recent measurements on a full-sized Bleriot aeroplane, while in flight, the unit lift was found, for gliding flight, to be about the same as that given in M. Eiffel's work for the Bleriot XI-bis wing model. (In propelled flight it was about 14% more, due to the action of the slip stream on the wings.)

It appears, therefore, that the actual pressure on aeroplane wings in flight does not differ greatly from that deduced from experiments on small surfaces.

NAVAL AVIATION ABROAD

In telling at one of The Aeronautical ›ciety's meetings recently, of the encourage- ent of the development of water flying ›road, with particular reference to the rench naval competition in which are offered izes aggregating $20,000 approximately, a milar competition in Germany, and the ›eed race, open to all nations, from Paris to eauville, about 110 miles along the Seine, ›r prizes totalling $8,000, G. C. Loening said ıat from an examination of the require- ents for these contests, it was evident that urope was awake to the development of ıval aviation and would soon outstrip us if e are not equally alert.

Among the requirements taken up were the ecessity for reefable or foldable wings; the imination, so far as possible, of lateral ropellers, the necessity of special air and ater controls for maneouvering in winds, ıe absolute protection of the motor against ıort circuits in the ignition system, the limination of aluminum except for parts ıking no stress, ease of starting motor from ilot's seat, stability when at rest on the water ı a high wind and hull strength to withstand ounding of waves without possibility of akage. With regard to the latter, Mr. Loen- ıg pointed out that metal construction had ıany advantages over wood, as the absorp- on of water by wood soon rendered a ma- hine incapable of flying.

The distinction between monoplane and bi- lane flying boats was then discussed and ome of the advantages of the monoplane, uch as greater height of the surface above the water, were pointed out. For greater safety he suggested that a better arrangement would be to mount the seats high in front and the motor low in the rear, instead of the motor high and the seats low in front and underneath it.

In closing he emphasized the amount of work that had yet to be done to make the aero-boat really seaworthy, and then read the French and German military conditions for flying boats.

The desiderata of the German naval department for hydroaeroplanes may be summed up as follows: The hydroaeroplane must be able first, to carry its pilot and a passenger weighing together 396 pounds.; second, to transport fuel, etc., for a flight of 4 hours; third, to travel at a speed of at least 62 miles an hour; fourth, to descend on the open sea, rough with waves produced by wind blowing 25 miles an hour; fifth, to remain floating on that rough sea during one hour with the motor stopped; sixth, to take flight off that rough sea; seventh, to take flight of three hours without any motor trouble. In addition to the possession of the above mentioned qualities, the hydroaeroplane is to be provided with two seats, each giving its occupant an uninterrupted view in front and below, the steering gear and the lever-handles of the motor must be within easy reach of the passenger as well as the pilot, both of whom should be able to start the motor. The hydroaeroplane must be provided with a device to permit of its being hoisted off the sea and placed on board ship.

HYDROMECHANIC EXPERIMENTS WITH FLYING BOAT HULLS

In view of the conflicting opinions held among the builders of hydroplanes regarding the most efficient number, shape and configuration of the steps of fast motor boat bottoms, the recent contribution of U. S. Naval Constructor H. C. Richardson is particularly interesting and instructive. Published by the Smithsonian Institution for the Advisory Committee of the Langley Laboratory, it deals with hydromechanic experiments carried on at the model basin at the Washington Navy Yards, with some five models of flying boat hulls with photographs, charts and diagrams of performance.

This work comprised an investigation of the forms of hulls of flying boats in order to determine:

(1) their resistance at "displacements corresponding to speeds," on the water, and (2) their resistances "submerged," as a means of approximating their total head resistance in air and of determining an approximate "coefficient of fineness of form."

As a result a form was derived which appears to have decided advantages over those already in use in the Navy, so far as resistance on the surface and in the air is concerned. Such a hull slightly modified to overcome structural difficulties is now being tried on a new Navy machine.

The principal deductions from the plotted resistance and trim curves are as follows:

a. At low speeds, suction is present.

b. This is succeeded by a condition in which the models run hard.

c. Which is succeeded by a condition at which the model begins to plane.

d. And just before the planing is established the slope of the curve lessens rapidly.

e. And when planing is established resistance falls off sharply with one exception.

f. Just preceding the "get-away" there is a tendency for the resistance to remain at an appreciable value, which

g. Falls to nothing sharply at the last.

Furthermore, conclusions drawn from these and previous experiments are as follows:

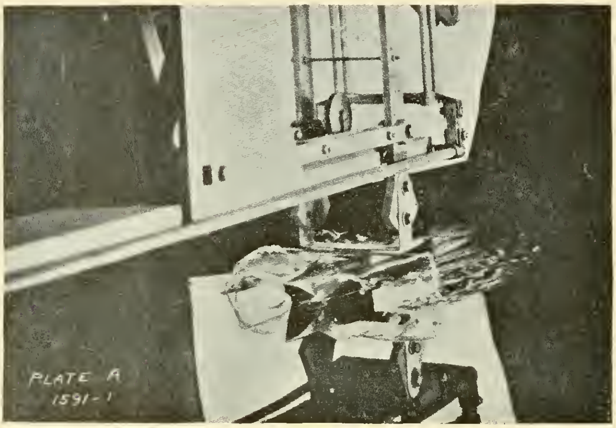


Fig. 2

a. The step should be close to the position of center of gravity, to eliminate a nosing tendency, to facilitate change of trim while planing, to avoid change of balance when getting away or landing.

b. Hollow V sections keep the spray down, cut the water more easily and cleanly, plane better a greatly reduce shock on landing when plowing through broken wa and practically eliminate the nec sity of shock absorbers.

c. A shallow step is sufficient, b ventilation is essential to faciliti the breaking of suction effects.

d. The bottom forward of t step should be inclined to the a of the machine, but

e. The inclination must not be great as to cause planing befo the controls are effective, and t is particularly necessary when ru ning before the wind. If the pla ing of the hull is to be pronounce the machine rises to the surfa with but very little control availal to maintain balance, and when ru ning before the wind this is mo apt to occur, due to the high wat speed necessary before the machi can take the air.

f. The bottom abaft the st should rise strongly, as this fave a steepening of the planing bow b fore suction is eliminated, and g the tail well clear when planing b gins.

Fig. 1 shows the bow end of t five models: 1592-1, 1593-1, 1591 1602-1 and 1617-2.

Logarithmic plots of the resi ance of models towed submerged speeds up to 15 knots show a proximate straight lines, thus ind cating that the power requir varies closely with the law of t

Fig. 3

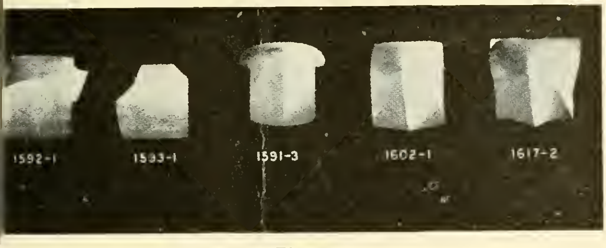


Fig. 1

Model 1591-3 was designed to viate the defects of the flat scow v type and introduces the V bot- for the purpose of parting her than pushing the water aside. e ventilated step was located so to be slightly to the rear of the c of g. This model was derived from 1591-1 (see Fig. 2), which was a true V type. 1591-1 ran very well except for a remarkable sheet of spray at a speed corresponding to 12 m. p. h. This sheet of spray is shown in Fig. 2. Due to this spray it was considered necessary to modify the model and this was done by making the V sections "full"; the principal effect of the change was to augment the sheet of spray so the opposite tack was next taken, that of making the V sections hollow in wake of the position from which the sheet of spray originated and 1591-3 was thus derived. The result was that the spray was held down, the planing effect increased and the resistance reduced, an all around improvement.

NEW INCORPORATIONS

Safer Aeroplane Company, Los Angeles, Cal.: capital, $75,000; directors, I. M. Baum, H. F. Sutton, T. R. MacLaren and F. H. Bivens.

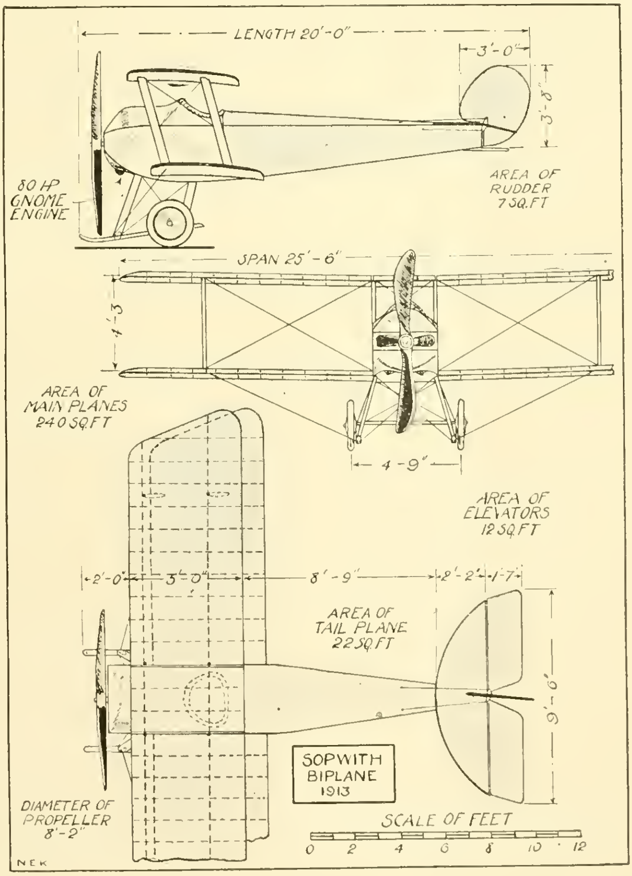
SOPWITH "TABLOID" WITH SPEED RANGE

A British-designed, British-built, d British-piloted machine has ide good in a big international ent, and for the first time in the story of aviation England has aten France thoroughly and most nvincingly. The Schneider trophy, e marine equivalent to the Gordon nnett trophy, has been won by oward Pixton on a Sopwith "tab-id" hydro-biplane with 100 h. p. nonosoupape" Gnome engine—the ly non-British feature, on April . Not only did the Sopwith bi-ane win the cup, but it established orld's records for hydro-aeroplanes r all distances to 300 kilometres, d proved that the generally ac-pted idea that a monoplane must faster than a biplane is not an shaken truth.

The course was laid out in the y of Monaco—10 kilometres to e lap, and 28 laps constituting e total distance to be covered, qual to 151 sea miles, or 174 land iles. The start had to be taken float, and two landings, or bumps," had to be made within a rescribed area during the first ound, these naturally detracting omewhat from the net speed for e whole race.

The other starters were Levas-eur (Nieuport catamaran—160 Gnome), Espanet (same), Bussi (F. B. A. flying boat—100 Gnome) and Lord Carberry (Deperdussin). Others id not start as they saw no chance f improving Pixton's time, which ight have been even better had not cylinder quit firing. The full ourse of 280 kilometres was com-leted in 2 h. 13.8 s., over 78 m. p. . average. His fastest lap was at 92 n. p. h. His official times were: 0 kil. in 20:57; 100 in 41:33; 150 n 1:02:31; 200 in 1:24:04; 250 in :46:59; 300 in 2:09:10.

The Sopwith "tabloid" 80 h. p. and machine is especially designed or speed variation, obtained by hrottling. The machine flies at its lowest speed under 37 m. p. h., at an angle of about 15 deg., with he motor being turned on and off successively. From this, to 92 m. p. h. loaded with fuel for 3 hours, pilot and passenger, is the range, flying its fastest at a negative angle of half a degree. The drawing, from Flight, shows the general appearance of this baby biplane. The weight of the machine empty, and with pilot and 3½ hours' fuel, is 670 and 1,060 lbs., respectively, giving a loading of 3 and 4.5 lbs. per sq. ft. The main planes, which are comparatively flat, are set at a slight dihedral angle and the top plane is staggered forward a foot.



They are built in two cells, the lower wings being attached to the fuselage and the top ones to the centre engine panel supported above the fuselage by two pairs of struts.

The fuselage follows Sopwith practice, rectangular in section, tapering to a vertical edge at the rear.

The landing chassis has been considerably modified, and consists of two short skids, each connected to the fuselage by a pair of struts. At the rear the skids are connected by a streamlined cross strut, in the centre of which is hinged the divided axle, carrying at its outer ex-

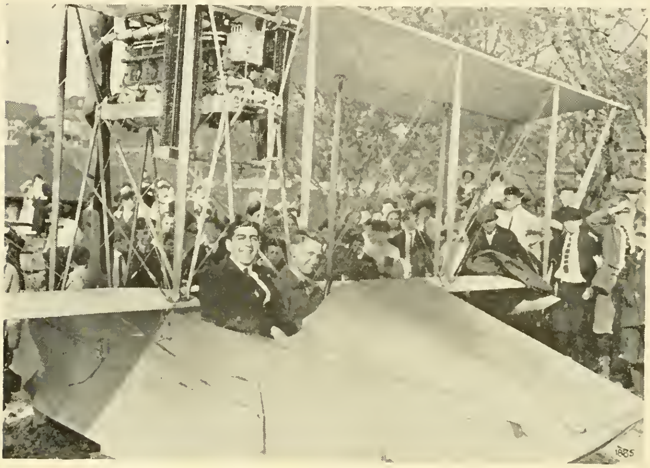
(Continued on page 135)

NEWEST THOMAS FLYING BOAT.

The feature of this latest Thomas flying boat is the metal hull, covering the wooden planking and framing. The 90-100 H. P. Austro-Daimler motor has been fitted with flaps over the air intake pipes so that the air can be shut off, making the mixture rich and allowing throttling to a very few turns while discharging and taking on passengers and running on the water to the beach. A little lever at the hand opens the air again for starting at full speed of engine. Steering with the rudder is by means of the standard hand wheel, the pillar rocking fore and aft for elevator. Each foot fits in a metal loop. Pushing out with the leg, just the same as the clutch pedal on an auto, on the high side of the machine pulls the high flap up and the low down, and vice versa. A magneto switch is provided as well. The throttle lever is arranged on the steering pillar.

The magneto is a Bosch two-spark, Bosch oiler. The bow is flat, coming to a straight V for about 18 inches forward of the step. From the step back to the rudder the bottom is flat. The hood opens longitudinally and occupants can step in from a float or from the beach, and walk to the comfortable seat. The motor swings a 7 ft. 11 in. by 5 ft. 6 in. propeller anti-clockwise in the breeze. The gas tank is on the top of the plane, made in streamline form. Double pipes feed to each of the two carburetors from either end of the tank so that gas is assured from either end, climbing or diving. Goodyear cloth is used for covering the planes.

On May 9 Ralph M. Brown flew the latest Thomas flying boat from Dobbs Ferry to the Hudson Boat Club at 127th street and North River, a distance of 16 miles. Brown carried Fausto Rodriguez, the representative of the Thomas Company, and flew over the Polo Grounds during the progress of a game between the Giants and Boston. Rodriguez dropped a bouquet of flowers with a note to John J. McGraw, manager of the Giants. After seeing the ball game a return trip was made to Dobbs Ferry and they covered the distance of 16 miles in the remarkable time of 12 minutes. For flying over New York Brown was suspended for three months from competing in meets. No contests are scheduled for 1914 thus far, so the penalty is minus any sting. On May 14 Mr. Rodriguez, who himself is an active member of the Aeronautical Society, invited Mr. Louis R. Adams, Acting President, Ernest L. Jones, Secretary and Wilbur R. Kimball to go to Dobbs Ferry and see the machine. Mr. Adams, Mr. Jones and Mr. Kimball had each a very nice ride on the machine. Mr. Adams can again lay good claims to being the first American aero club president to actually fly in an aeroplane. The machine will remain at Dobbs Ferry for a couple of weeks longer, available for demonstration flights. Several turns up and down the river were made between Yonkers and Tarrytown, outstripping the New York Central trains. The machine climbs very fast and has a large surplus of power.



Rodriguez and Brown in the New Thomas

FRANKLIN INSTITUTE HONORS O. WRIGHT

Orville Wright will be presented with the Elliott Cresson Gold Medal by the Franklin Institute at its final stated meeting on Wednesday, the 20th inst., "in recognition of the epoch-making work accomplished by him, at first together with his brother, Wilbur, and latterly alone, in establishing on a practical basis the Science and Art of Aviation."

FLIES TO GOLF GAME

On May 9th, Charles Fay, a Thomas exhibition flyer, flew with the wind from the aviation field at Bath over to Elmira, a distance of 38 miles, in 25 minutes, in the standard Thomas biplane, fitted with a Curtiss OX motor. After playing a game of golf and spending the evening, he returned to Bath the following day.

SEVEN BALLOONS TO RACE.

Seven balloons have been en tered for the national balloon rac this year, from St. Louis July 1 The pilots named are Dr. James Kingsbury, of New York; E. Cole, H. E. Honeywell and W. Assmann, of St. Louis; Arthur Atherholt, of Philadelphia; Roy Donaldson, of Springfield, Ill., an R. A. D. Preston, of Akron, Ohi

May 11.—A. T. Atherholt travel from Holmesburg, Pa., in the "Per 1," making landings at Pemberto Hanover and Lisbon, N. J.

May 9.—Leo Stevens and passe ger, another beautiful young lady of the movies, made a trip from Pa isade Park, which is in New Jerse to the usual safe landing on th shore of Jamaica Bay in his hydr gen balloon. Miss White is th leading lady of "The Perils Pauline" and was supposed to mak the ascension alone. Without balloo experience this was impossible an Mr. Stevens was viewing the scener from the bottom of the basket a the start, taking hold of affair himself on arriving at a highe altitude. The perils of the air wer soon over for Pauline and the ascen was a novelty for the young lady.

May 13.—The aeronautical exper ences of Pauline were finished a Philadelphia with a coal gas ascen by Mr. Stevens alone, the landin made at Hanover Farms, also i New Jersey. No tickets have as ye been received in the editorial de partment.

GOODYEAR BALLOON CROSSES LAKE ERIE

The first flight of the present sea son for the Goodyear Aero Clu was made from Akron on May 2 The passengers were C. P. Mood and Charles Becker, with R. H Upson, pilot. Staying in the air thi teen hours, they made a successfu passage of Lake Erie and landed i Ridgetown, Ontario, the next morn ing, a distance of 100 miles.

The second annual meeting of th Goodyear Aero Club was held Ma 5th, and plans were launched fo the ensuing year.

BEACHEY FLIES IN NEW YORK

Lincoln Beachey and Barney Old field will fight out the "Champion ship of the Universe" at Brighto Beach, May 22-24, under the abl and alliterative management o William Bill Adjective Pickens Beachey is scheduled to do th loop, upside-down flying, race Bar ney, and generally throw thrills Beachey does about all the death defying feats known to the air, ex cept fly backward. Barney will use the old Christie front-drive racer which is sufficient bull for the lan events, and Bill will supply the ver bal pyrotechnics.

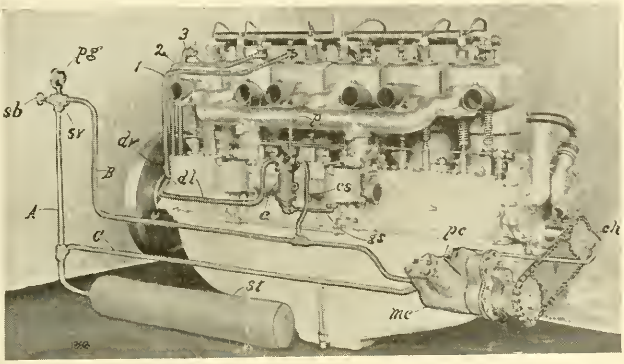
FLYING FERRY FOR PANAMA-PACIFIC

The B. F. Sturtevant Company has just received an order for one of the new 100-h.p. engines for the Bay Cities Flying Boat Company which will carry all the World's Fair visitors across from Oakland to San Francisco.

WALKER AIR STARTER

The illustration shows this air starter as it might be applied to a 6-cylinder 80 h. p. Sturtevant motor by the Walker Starter Co. of La-Porte, Ind.

One will note connections to the three cylinders next the fly wheel. Suppose the order of firing is 1-5-3-6-2-4, by connecting this way the starter will fire every other cylinder as 1-3-2-. All six cylinders could be connected up, but this is not necessary with this system, as the engine is turned independent of these leads by the air-motor (air-compressor acting as an air-motor). The parts are represented as follows: (sb) starting button; (pg) pressure gauge; (sv) starting valve; (A) lead from tank to starting valve; (B) lead from starting valve to starter; (C) lead from compressor to tank; (st) storage tank; (cs) air-supply to carbureter; (c) carbureter; (dl) mixture supply from carbureter to distributing valve; (dv) distributing valve; (1), (2) and (3) leads to special check valves on the cylinders 1, 2 and 3 of the engine; (gs) supplies the carbureter with gasoline; (mc) motor and compressor combined; (ch) air clutch; (pc) pressure controlling valve; (p) primer.



There is no attention required from the operator with this system other than pressing the starting button (sb) to start the engine. By this system one need only employ a small reserve tank, as only enough air is used to create mixture sufficient to fill the explosion chamber at the firing point, when further energy is imparted to the piston by the internal combustion of this charge, which expands against the piston with raising pressure to the end of its stroke, giving a spring-like impulse far different from the ordinary hot gas explosion got from starting on the spark.

The starter consists of air tank, starting valve, pressure gauge, compressed air carbureter, distributing valve, controlling valve, clutch, air compressor, which automatically changes to an air motor whenever the starting valve is opened, and special check valves.

When it is desired to start, the driver presses the starting button (sb) and compressed air rushes through the pipe-line (B) to the control valve (pc) which causes the clutch (ch) to engage and then allows the air to pass into the motor valves on the air compressor and start it to turning, thus turning the engine. At the same time the compressed air passes through the starting carbureter (c) where it is properly charged, to the distributing valve (dv), which is operated from the cam shaft so as to release the compressed mixture into the different cylinders in charges at the beginning of their respective firing strokes. The spark is retarded so as to occur just after the charge is injected into the explosion chamber and thus ignite it. As the engine starts, the compressor commences at once to restore the pressure in the tank to the maximum when the valve (pc) acts on the clutch (ch), disengaging it. The clutch may also be thrown in or out at the will of the operator and independent of the air, from his seat.

It takes from thirty seconds to one minute to restore the pressure used in starting. While the starter will work with 50 pounds pressure, a higher maximum pressure allows the storing of a greater volume of air in a smaller tank, and as this carbureter will work just as efficient and positive at high pressures, with no changing in any way, as it does at lower pressures, a tank not larger than 8 x 36 inches is of sufficient capacity for aeroplane motors.

The great feature of this system lies in the carbureter, for no matter how an engine is to be started, it must have a mixture of gas that will explode before it will start. This carbureter is dependent upon the air pressure alone passing to it from the tank, and as long as air passes to it, gasoline will be thoroughly broken up and mixed with it in exact proportion to form an ignitable charge. Whenever the starting valve is pressed a perfect charge is created and injected into the explosion chamber in an instant, existing there under pressure as the spark occurs to ignite it, before other conditions have a chance to effect it. Frosty cylinder walls have no chance to rob it and there is no heat to it to create a sweat over the inside of the cylinder walls and plug by drawing the frost. Heat can affect it in no way except to aid in igniting it, for the proportion and mixing is complete.

SOPWITH "TABLOID"

(Continued from page 133)

tremities the disc wheels. In its normal position, the axles lie in a groove formed in the cross strut, thus maintaining the stream line effect of the latter. The axle is sprung by means of rubber shock absorbers attached to the skids, and is held in position by two very short radius rods, hinged to the rear extremities of the skids. In order to prevent the cross strut from bending downwards in the middle, it is braced at this point to the fuselage by a wire. The tail consists of a semi-circular stabilizing plane, to the trailing edge of which are hinged two elevator flaps with a balanced vertical rudder, almost circular in shape, between them. Lateral control is by wing-warping, the movement being carried out by a wheel mounted on a vertical column, a fore-and-aft movement of which operates the rear elevators through a connecting rod and counter-shaft. The warp cables are led from a rock-shaft to pulleys let into the uprights of the fuselage just above the rear spar attachments of the lower plane. From these pulleys the cables go to the top sockets of the rear outer struts. A continuous cable also runs from each of the outer rear strut sockets of the lower plane over pulleys on the tops of the two rear struts attached to the fuselage.

PEGOUD MAY FLY IN NEW YORK.

If plans now under way turn out as expected, Pegoud may be expected in New York. Pegoud is under contract and receives the small sum of $6,000 a day for his flying, which is almost as much as the editor of an aeronautical paper gets.

ARMY AVIATION.

The Signal Corps' machines and aviators are still at Galveston and are awaiting orders. What the outcome of the present situation will be nobody knows. There seems to be no truth in the story that a supply of bombs is being prepared and held at North Island; and if there were anything in the story it would, naturally, not be given out for publication. To show the absurdity of some rumors that go about, Colonel Reber was called up a few days ago and asked if the report that was circulating in New York that the Army was buying thirty aeroplanes was correct. There was absolutely no foundation for the statement. In these days, when everybody is trying to sell all the machines in the world to the Government, one can naturally expect a crop of rumors.

For the week ending April 18 the total number of flights were 68; total time in air, 27 hours; passengers carried, 37.

Summary, Jan. 1 to April 18: Total number flights, 944; total time in air, 257 hours, 50½ minutes; passengers carried, 466.

REBELS DROP BOMBS.

On May 7 it was reported that an aviator in a rebel biplane dropped two bombs into Mazatlan, killing 4 and wounding 8 other persons. The biplane was operated by a nephew of General Carranza, the leader of the Constitutionalists. The people were panic-stricken over the explosion of the bomb and many fled in terror.

On May 14 there was a report that the Federal gunboat Guerrero has been disabled by bombs dropped by an aeroplane piloted by Captain Salinas Carranza, a nephew of General Venustiano Carranza, according to report to General Carranza received today from General Alvaro Obregon, commanding the Constitutionalist forces at Mazatlan.

General Obregon said the aeroplanes had done effective work in dropping bombs on the Federal intrenchments and had caused the abandonment of several strong positions.

"War aeroplanes continue their activity at Mazatlan, according to a dispatch received at the Navy Department from Admiral Howard. Two bombs were dropped from the rebel aircraft into Federal intrenchments yesterday, but whether they killed any one is not stated."

The Mexican Federals, according to recent press accounts, have three monoplanes suitable for scout and bomb throwing purposes. The Federal aviators include Lieut. Gustavius Salinas, Alberto Salinas, Juan Alderso, H. Ruiz and Rodriguez Salazar. The aeroplanes are said to be in the vicinity of Vera Cruz.

William A. Staats, New York representative of the Mexican Constitutionalists, has been ordered by telegraph to ship the two monoplanes recently built for General Carranza at the Moisant factory to some point in Texas near the Mexican border. The message was signed by Alberto Salinas, a nephew of General Carranza and a member of the staff of the rebel chief. It was sent from Torreon.

Salinas also says he has been ordered to join General Villa in the Saltillo campaign and that General Carranza is on his way to Durango.

The message does not say whether the rebels will try to smuggle the machines into Mexico, but Mr. Staats infers that they will be held in Texas until the embargo is lifted. One of these machines is at Hempstead ready to ship. The other will be ready in a few days for the 8,000 foot altitude test exacted by General Carranza.

Charles F. Niles will make the altitude test. He flew 11,000 feet high with the other machine several weeks ago, and Mr. Staats accepted it for General Carranza and paid a deposit.

On April 30 Calexico, Calif., was thrown into a fever of excitement by the report that about 11 o'clock at night an aeroplane had passed over the camp of the First Battalion, N. G. C., now guarding the border together with the regular troops at this point.

A soldier machinist familiar with all styles of airships claims that the invader was of the French type of biplane. It is known that some time ago the Constitutionalists smuggled across the border a biplane to be used against the Federals at Guaymas. This machine was afterward captured by the Huertistas, who are now in control at Mexicali.

The aeroplane made a second appearance over the military cam about 2 a. m. and was plainly see near outpost number four.

SCOTT DROPPING BOMBS

As previously announced exclusively in AERONAUTICS, Rile E. Scott, the inventor of an apparatus for dropping bombs fro an aeroplane and winner of th Michelin prize for bomb-dropping i 1912, is now at the Signal Corp Aviation School at San Diego, Cal. carrying on a series of tests fo the army.

These tests include the droppin of high-explosive bombs varying i weight up to 100 lbs. Mr. Scot has again demonstrated that bomb can be dropped with great accuracy, and the results of his test with high explosives are awaite with great interest by the arm authorities. As these are the firs experiments ever made with larg charges of high explosives droppe with a scientific apparatus, the dat obtained ought to be edifying a well as conclusive. Scott will return to New York about June 1st

(See AERONAUTICS, August 1911; November, 1911; February 1912; September, 1912.)

Fort Sam Houston, at San Antonio, will eventually be an aviation center, as approved over a yea ago. This is not the aviation center of the Signal Corps, but the station for the First Aero Squadron.

NAVAL AIRCRAFT PROVE WORTH.

The first time in which naval aircraft have been operated on practically a war airing was at Vera Cruz, when the U. S. Navy aviators reconnoitered the country round about the city.

Following the first successful work, Lieut. Bellinger flew inland 20 miles on April 29 and reported seeing "two detachments of Federal troops, one of 5,000 infantry and the other of 2,000 men with artillery, near Tejeria, whither General Maas went after leaving Vera Cruz."

The navy aviators the next day made several more scouting flights to the west, south and north and found only the "force they saw previously, about 1,000 soldiers out along the tracks, apparently moving further west. It looked as if the railroad could be destroyed very quickly for many miles into the mountains. There were fires, showing that ties were being burned and rails removed."

On May 6 Bellinger was fired on as he found two holes in the wings.

On May 10 another report comes of a flight by Bellinger with Capt. Newbold of the Army as observer. Bellinger, Saufley and other flyers are now well acquainted with the territory for 25 miles around.

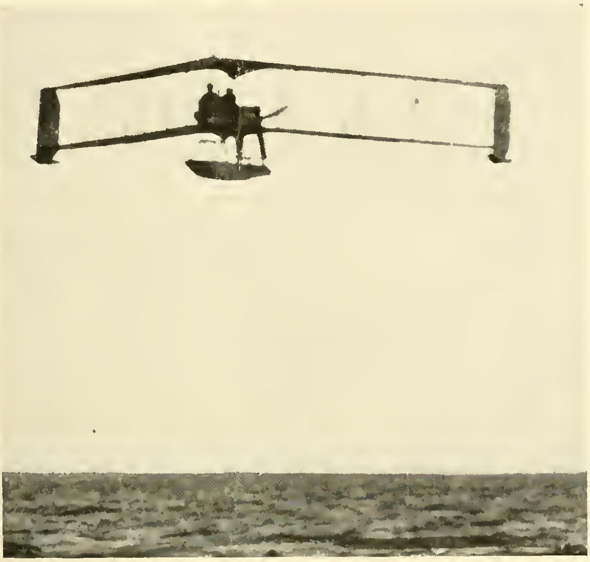
The Navy aviators are distributed as follows: On the Birmingham at Tampico are Lieut. J. H. Towers, Lieut. B. L. Smith, Ensign G. de C. Chevalier, with 10 men from the Pensacola aeronautic station and two Curtiss flying boats and 1 hydroaeroplane On the Mississippi at Vera Cruz are: Lieut. Comdr. H. C. Mustin, Lieut. P. N. L. Bellinger, Ensigns W. D. La Mont and M. L. Stolz, with two Curtiss flying boats and a Curtiss O. W. L. hydro.

Left at Pensacola are: Lieut. W. W. McIlvaine and 30 men Lieut. F. D. Herbster is on inspection duty of unfinished machines.

Credit should be given Captain W. I. Chambers for the efficiency of the aeronautical equipment of the Navy, which is ahead of that of any other Navy in the world at the present time. It was Captain Chambers who evolved the O. W. L. type of machine, the launching catapult and the latest flying boat of Curtiss make. His application to the improvement of Naval aeronautics was at the expense of personal advancement.

News In General

INHERENTLY STABLE DUNNE "SOLVES PROBLEM"



That "The Burgess-Dunne solves ıe problem of inherent stability and epresents an important development ı American aeronautics" is the erdict of an Aero Club committee, omposed of E. J. Wendell, H. Voodhouse, H. Huntington, J. A. teinmetz, E. B. Bronson and K. I. Turner, which visited Marblehead on May 2d to witness flights f the Burgess-Dunne machine, of which drawings and description were published in AERONAUTICS or March 31st.

Manager F. H. Russell explained o the committee the principle of he machine. He said: "The Burgess-Dunne aeroplane is contructed on a principle which affords nherent stability in flight, the wing nds checking each other during light, counteracting changes in the elative lift of bow and stern, and hecking all tendencies to dive when lescending with motor cut off. On neeting side gusts, the nearer wing, eing broadside on and at an unavorable angle for lifting, acts as a weather vane to turn the machine nto the teeth of the disturbance, while the further wing, offering ittle head resistance, is speeded up and so prevented from falling, the results being that the aeroplane keeps on an even keel. The steerng and elevating of the Burgess-Dunne is controlled by a single set of levers, and ailerons are used only as rudders, and not for lateral control. The machine is supported by a single pontoon, but the ends of the planes are equipped with floats which touch the water, so that while the machine is on the water it always has three points of contact and cannot submerge its wings, no matter how rough the water may be, as other aeroplanes do. The controls are self-locking, and when set the machine would fly in a straight line or circle, or up or down, and the pilot would be relieved of all work until a change of direction is desired, and the machine would stabilize itself automatically.

The observers, through field glasses, watched Webster take his hands off the controls as he approached, and "the machine continued its flight without the slightest change of evenness. Then followed four circular flights, at a height of about 200 feet. During the fourth circle the pilot took his hands off the controls and held them over his head for practically the entire circle. Although the wind was stiff (about forty miles), the seaplane's flight was not perceptibly affected. At the end of this circle the seaplane rose to a height of about 500 feet, where the pilot cut off the motor and put his hands up over his head. The seaplane descended in a spiral, during which the 'plane was but slightly inclined. At the height of about 100 feet, the aviator resumed control and rose again and made another circular flight. Then, from the height of about 500 feet, the pilot took his hands off the levers and glided in straight line toward the boat of the observers. At a height of about 50 feet he resumed control, threw the machine to a steep angle of descent, then straightened it and landed lightly within ten yards of the point first touched, and 'taxied' to three yards from the observers' boat. A rope was then thrown from the boat, which Webster caught (that is, he caught the rope, not the boat), and the seaplane was made fast to the boat." For a few minutes the machine "floated on the choppy water without tipping or sinking in any way."

Webster started the motor again and "took his hands off the levers. The machine glided for about 250 feet, then rose in the air, the pilot's hands still off the levers, where they remained until the seaplane had reached a height of about 40 feet."

Following some short-speed trials, Webster "described four circles, just over the observers' boat, during which the machine banked at a steep angle. In the last two circles Aviator Webster held his hands over his head, to the amazement of the observers, in turns when the machine banked steep, and held his hands up until the machine had resumed even keel. At the end of the last circle, with the wind blowing again at 40 m.p.h., Webster rose to a height of 1,200 feet, then cut off the power and took his hands off the control. The seaplane glided down at a slight angle. At about 40 feet from the water Webster reassumed control, forced the machine to a steep angle of descent, then straightened and landed lightly a few feet from the observers' boat. The time occupied by the glide was 43.1 seconds."

"During the flights the members of the committee had occasion to study the opration and action of the seaplane at close range, and were amazed at the extraordinary demonstration of inherent stability, airworthiness and ease of operation. In all the turns, the seaplane maintained its height without the slightest drop; during the flights uncontrolled by the pilot, the machine corrected its lateral deviations mechanically and maintained even flight; in landing it glided lightly on the water, appeared easily controlled and floated well."

The photograph shows the machine gliding down with a passenger, on an absolutely level keel. The fact is, the seaplane is dropping like a parachute. One will notice the propeller is still.

CURTISS HAS NON-INFRINGING CONTROL.

Glenn H. Curtiss has announced that there has been perfected at his plant a lateral balancing system which, it is alleged, does not infringe the Wright patent, as construed by the Court decision, and yet one which is perfectly practical.

In the Austrian flying contests for the Schicht prize held April 19 to 26 last, all the machines finishing the course used Bosch magnetos, Bosch plugs and Bosch starters.

DE VILLERS AGAIN IN COURT

Reese Sharp, of Ord, Neb., has sued the Aeroplanes, Motors and Equipment Co. for the recovery of $250 sent by Sharp on account of the purchase price of an Anzani motor.

The plaintiff alleges that he proposed to wire $250 on account of the purchase price, if on receipt thereof the Aeroplanes Company would ship the motor to Sharp C. O. D., subject to examination; that the company accepted the proposal by wire, and stated the motor would be sent on receipt of the $250; that the $250 was sent; that the defendant company advised him the motor had been taken from the Custom House and would be shipped the following morning; that two days later the defendant wired Sharp that motor could not be sent as at first promised, but only upon receipt of the balance of $250; that Sharp was unwilling to send any more money to a concern that had so "flagrantly broken its agreement," and that either the defendant company ship the motor C. O. D., subject to examination, according to agreement, or return the $250; that the defendant failed to do either. The case will be tried in the near future.

AT THE WRIGHT SCHOOL

Although the season of the year is still quite early for any considerable activity at aviation schools, there is much work being done at the Wright land school at Simms Station, where Howard M. Rinehart, the expert Wright pilot, is training three new Wright pupils, Lloyd V. Norman of Chicago, Ill., Jesse A. Carpenter of Chicago, Ill., and Earl Utter of Columbus Junction, Iowa.

The school machines now used at the field are equipped with the new Wright elevator and the inherent stability given to the machines by this latest invention of Mr. Wright enables the pupils to acquire longitudinal control very rapidly and precludes the possibility of any false maneuvers causing serious disturbances in equilibrium.

In view of the Mexican crisis there is considerable activity in aviation matters at Dayton, and work on the new Government machines is being rushed to conclusion.

Announcement will be made shortly of the newest type of Wright Aeroboat built for the United States Navy, which it is said is an unusual innovation in flying boat practice.

The honor of being the first pupil to graduate from the Wright School in the year 1914 falls to Lloyd V. Norman, of Chicago, who successfully completed his test flights on Saturday, May 9, after having spent only three weeks at the Wright School. In addition to Mr. Norman, Instructor Howard H. Rinehart, the expert Wright flyer, is progressing rapidly with the instruction of Jesse A. Carpenter, of Chicago, and Earl Utter, of Columbus Junction, Iowa.

Instruction on the school machines is made particularly easy by their equipment with the new type of rudder, which tends to make the machine automatically stable, but at the same time gives a degree of preciseness and delicateness to the control which is most satisfactory.

In addition to the flights of the pupils at Simms Station, during the past week, Mr. Wright has made many flights in his constant endeavor to improve aeroplanes. Although the weather has not been good, the pupils have been kept quite busy practising on the training machine and in learning the construction of aeroplanes at the factory. The number of pupils who are coming to the school in the course of the next few weeks makes it likely that the school term this year will decidedly be a record breaker.

HARRIS KILLED

Akron, O., May 3.—"H. P. Harris" (E. G. Rich), aviator, fell to his death in an exhibition flight north of here today. He drew only a few breaths after being taken from the wreck, and died in an automobile on the way to a hospital.

It was simply a matter of the machine breaking down under the force of a very steep dive, with too sharp a turnup at the bottom. Probably one of the wires or vertical struts was the first to break, but the whole wing crumpled and broke away from the rest of the machine so quickly that it was hardly possible to tell. Harris either was thrown or jumped from the machine while still about fifty feet from the ground. He landed clear of the machine, and was still living when picked up.

The machine was a Curtiss type. John Gammeter, of Akron, is the moving spirit in the Silver Lake Aviation Company.

DEATH OF ROYSTONE

Los Angeles, Cal., April 28.—Charles C. Roystone, an aviator, fell 800 feet at Dominguez Junction, south of here, to-day and died shortly afterward. Roystone, flying a monoplane, was on his way to San Diego to demonstrate an aerial bomb-hurling device to the army officers at the government aviation camp. An examination of the wreck showed "the steering rod had snapped." The machine was a Dep copy.

VAN NESS KILLED.

Percival Van Ness, of Utica, N. Y., was killed on May 8 in making the second flight with a new machine. Eye-witnesses state the cause was too fast climbing.

VOLUNTEER AVIATORS FOR THE ARMY

The recent offers by self-styled colonels of volunteer aviation corps of assistance in the war (?) with Mexico recall the voiced sentiments of army officers on the uselessness of civilian aviators for scouting and for offensive operations in the event of war, even where the aviators were experienced exhibition flyers and were actually experts and owners of machines. It is obvious that a corps without machines, and without even pilots of experience, would be worse than useless.

As urged in AERONAUTICS, provision should be made for the encouragement of bona fide civilian aviation corps, and actual experience with troops in war games be arranged, in order that aviator-owners would be of value in case of need. It would be a profitable investment, should Congress be induced to furnish money enough for the expenses of a two-weeks' training camp in connection with regular army or national guard maneuvers.

That military training is needed to make soldiers of civilian aviators was urged by well-known officers in the hearing before the Committee on Military Affairs last year.

GEN. SCHRIVEN: If you should scrape the country over, I doubt if you could find 20 aviators who are suitable for the military service.

COL. REBER: The mere idea that a man has taken a pilot's license does not mean everything. That may mean a man's ability to control a machine under given conditions in still air, but it means nothing so far as ability to fly a machine across the country is concerned. There are not ten men in this country to-day, out of 247 licensed pilots, who could make a flight of 200 miles overland. They have not the experience. They have grown up as exhibition flyers, and some of them have made wonderful records, but I do say that there is not one of those ten aviators who would be of any value to a military commander with his machine. In the maneuvers held las year, under the direction of th Signal Corps of the State of New York, an aviator, who was consid ered a wonderful flyer, volunteered his services. He was given the same problems that were given the military aviators, and was asked to submit his report in the same way that they did. He went up and came down, and came to me—I happened to be in charge at the time—and he said: "I went up all right, and I saw something, but I have not the faintest idea of what it was. I do not know the difference between a wagon and a tent when I get up at that height." In other words, he had not the training necessary to give him the proper military foundation; he had not the training necessary to pick out the different given objects when viewed from a great height. You must give these men some military training; you must make soldier men of them, so they can gain the information required; and then, of course, the aviator will utilize his ability as a flyer to bring it back.

LIEUT. ARNOLD: It does not take long to teach a man to fly, but it takes a long time to make a military aviator. It is easy to teach a man to fly. They are doing it now at the Wright school in ten days, and a man can learn to fly in ten days. To make a man an expert military aviator cannot possibly be done under one year.

LIEUT. MILLING: I have been associated with civilian flyers, both in meets and at the last maneuvers at Bridgeport. As a rule, these men fly around a field, but they do no military work. They cannot read a map, and half of them, if attempting cross-country flights, will get lost. Finding the way through the air across country is one-half of the game. Now, from our experience there, it was found that these men were absolutely useless.

AERONAUTICS

Combined with "FLY"

ıblished semi-monthly in the best interests of Aero-ıutics

BY

AERONAUTICS PRESS INC.
250 West 54th Street
New York
Telephone, Columbus 8721
Cable, Aeronautics, New York

RNEST L. JONES	Editor
. B. SELLERS,	Technical Editor
ARRY SCHULTZ,	Model Editor
A. BEIER,	Advertising

ıtered as Second Class Mail Matter, September 22, ı08, under the Act of March 3, 1879. $3.00 a year, cents a Copy.

ɔstage free in the United States, Hawaii, the Philip-nes and Porto Rico. 25 Cents extra for Canada ıd Mexico. 50 Cents extra for all other countries.

ıe magazine is issued on the 15th and 30th of each onth. All copy must be received 6 days before ıte of publication. If proof is to be shown, allow-ıce must be made for receipt and return.

ake all checks and money orders free of exchange ıd payable to AERONAUTICS PRESS.

ıbscribers will kindly notify this office if discon-ıuance is desired at the end of their subscription ɛriod, otherwise it will be assumed that their sub-ription is to be continued.

Broadway Central Hotel

CORNER THIRD STREET

In the Heart of New York

Special attention given to Ladies unescorted

SPECIAL RATES FOR SUMMER

OUR TABLE is the foundation of our enormous business

AMERICAN PLAN	$2.50 upwards
EUROPEAN PLAN	$1.00 upwards

Send for Large Colored Map and Guide of New York, FREE

TILLY HAYNES, Proprietor — DANIEL C. WEBB, Manager, Formerly of Charleston, S. C.

The Only New York Hotel Featuring AMERICAN PLAN

Excellent Food **Good Service**
Moderate Prices

INVENTORS' MODELS

Constructed of any material

Estimates made from drawings. Low prices.

H. C. BROWN, *Machinist*
54 PARK AVENUE -:- BROOKLYN, N. Y.

SMOKE THE FAMOUS CIGARS

LA MURIEN

Made in all sizes from $6.00 to $15.00 per 100
HIGHEST QUALITY HAVANA CIGARS
ADOLPH HIRTENSTEIN, 330 Fourth Av., New York
Mention Aeronautics

BAMBOO

Special grades of Bamboo for Aeronautic Work. Reed, Rattan and Split Bamboo for models. Tonka Rattan for Skids 1¼ diameter and under any length.

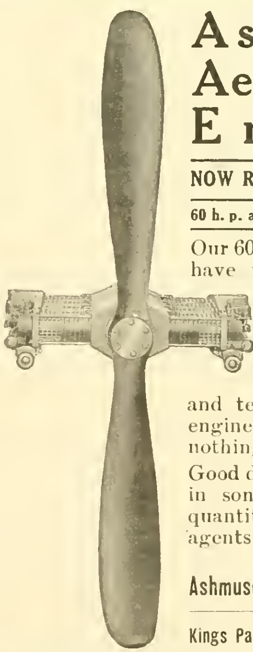
J. DELTOUR, Inc. 804-810 Jefferson St., Hoboken, N. J.

MAGNETOS

All Makes Repaired, Sold and Exchanged

Mail orders given special attention

Hecht's Magneto Exchange
230 West 49th Street - New York
Member of The Aeronautical Society



Ashmusen Aeronautical Engines

NOW READY FOR THE MARKET

60 h. p. and 90 h. p., other sizes to order

Our 60 h.p. 8 cylinder engines have flown Wright's Twin-screw, Curtiss-type and Tractor Biplanes, and Bleriot-type Monoplane.

6 yrs. experimenting and testing on Aeronautical engines alone. We make nothing else.

Good discounts to first buyers in some localities, and on quantity contracts, and to agents.

Agencies Open

Ashmusen Manufacturing Company
INC.
Kings Park, Long Island - New York

CHRISTOFFERSON WINS 324-MILE RACE

Silas Christofferson, with a Curtiss-type biplane of his own make, Curtiss 100 H. P. motor, landed first at Bakersfield in the race from San Francisco to that point on April 21-22. The actual time flying is given as 4 h. 39 m.

H. W. Blakely was second in arriving with his 100 H. P. Hall-Scott-Curtiss type biplane. Lost above the clouds, Blakeley landed first at Sacramento, flying thence to Stockton, 126 miles out of the course, night stop there, and on to Dinuba, where he caught up with Christofferson. Christofferson left 15 minutes ahead. In getting off at his next stop at Ducor, Blakeley broke a strut, and flew in this way to Bakersfield. Actual flying time was 4 h. 8 m. The course actually flown was some 450 miles, an average of 108.8 miles an hour.

Arthur Rybitski, who flew an 80 H. P. Curtiss, motored Curtiss copy, finished the third day. Rybitski had various troubles all along the route.

The course was irregular, compulsory stops being at Stockton and Dinuba, while certain other towns had to be flown over. The map seems to show the figures given. Blakeley states that over a mile race course the measured speed was 110 m. p. h. Blakeley reports on the motor are most enthusiastic. The propeller. 7 ft. 6 in. by 7 in. pitch, turned 1,400 r. p. m.

LANDS ON WIRES

First trials made on May 11 at the Hempstead aviation field with the wire launching and landing device of James T. Amiss, of Baton Rouge, La., demonstrated the practicability of landing and starting aeroplanes on wires from battleships or on bad grounds.

John Guy Gilpatric, using a Sloane monoplane equipped with rollers, alighted successfully on the wire pathway, but the machine not being equipped with brakes, which are part of the design, rolled off the end of the runway.

The apparatus consists of a landing platform made of a network of wires ten inches apart stretched between two rows of posts 200 feet apart. Any aeroplane or hydroaeroplane can be adapted to land on these wires by a simple attachment of rollers underneath the chassis and the fitting of a special arrangement of hooks which catch on the wires when the machine alights and prevents it from bouncing or tipping over. When it is desired to start the aeroplane these hooks are turned so that they disengage from the wires and the aeroplane runs along on its rollers just as it would on wheels.

SLOANE ISSUES CATALOG

A very interesting and instructive catalog giving descriptions, photographs, drawings and prices of the Anzani, Gnome, Le Rhone and Austro-Daimler motors has just been issued by the Sloane Aeroplane Company.

The catalog which tells all about these motors is well gotten up and is nicely illustrated.

No one at all interested in flying should be without a copy of this catalog, which will be sent free to any address.

ADVERTISING TALKS V

Do you manufacturers have the names and addresses of all those known to be interested in flying in the United States? If you had the mailing list of every aeronautical magazine in this country, how much would it cost to print 144 or more pages and mail to each one? The cost would be prohibitive.

Through AERONAUTICS you reach these people for from 1/15th to 1/220th of the cost. And you reach them with the unbiased views of the disinterested. Notes in reading pages on your apparatus are given full credence as they are those of a pioneer authority on American aeronautics. Bother the cost, would your circulars or your catalogues do for you the equal of the pages of AERONAUTICS?

To what extent are you supporting AERONAUTICS?

29 West 39th Street, New York

OFFICIAL BULLETIN.

Next General Meeting.

The next meeting will be held June 11. Mr. James Means is expected to deliver a paper on smoke signalling in the near future. At the June 11th meeting a new aeronautical wireless set will be described and shown by its inventor, Mr. Dubilier.

Data Sheets.

The first seven data sheets issued by the Technical Board have been sent out. Others are now ready for publication. All members in good standing are entitled to these.

These data sheets provide members with information which could be obtained only at great expense by subscribing to every aeronautical publication issued in the world, by buying every book published, by obtaining reports of every laboratory and testing plant, with the attendant expense of translation and time of abstracting.

Leather loose-leaf books may be had for binding these data sheets at $2, provided a number of orders can be secured at one time.

The data sheets are issued free to members as fast as they can be prepared.

Membership dues in The Aeronautical Society are $10 a year, no initiation fee. Members receive data sheets, the magazine, AERONAUTICS, engraved certificate of membership, free monthly lectures. For further information address the Secretary.

New Members.

Emile Brouard, 470 West 34th street, New York.

Meeting of May 14.

George Clifton delivered an illustrated paper on "Color Photography" which was hugely interesting and profitable. By means of a balopticon and lantern, several hundred photographs of interest were shown, many of which had never before been seen. Wilbur R. Kimball read an abstract of the hydromechanic experiments with flying boat hulls made by Naval Constructor Richardson, the report of which has been issued by the Langley Aerodynamical Laboratory.

Notice to Delinquents.

Delinquents in payment of dues are earnestly requested to place themselves in good standing at the earliest possible moment in order that they may receive the official bulletin, AERONAUTICS, semi-monthly, the membership certificates and data sheets.

OFFICIAL BULLETIN

OFFICERS.

Clarence P. Wynne, *President.*
Jos. A. Steinmetz, *1st Vice-President.*
Wm. D. Harris, *2nd Vice-President.*
George S. Gassner, Secretary
Laurence Maresch, *Treasurer.*

DIRECTORS.

Arthur T. Atherholt.	Harold H. Knerr.
H. F. Bamberger.	Wm. H. Sheahan.
Dr. Samuel C. Falls.	Walter S. Wheeler.

Office of the Club, Bellevue-Stratford, Phila., Pa.

On Friday evening, May 1st, the Aero Club of Pennsylvania entertained Lieut. John Cyril Porte, R. N., at a reception in the Clover Room of the Bellevue-Stratford Hotel, in Philadelphia. Lieut. Porte was thus honored for the reason that he has been selected as one of the pilots in the trans-Atlantic flight, which it is expected will take place during the course of the coming summer, and which is being financed by Mr. Rodman Wanamaker, a member of the Aero Club of Pennsylvania, and the machine for which is now being built by Curtiss.

About 300 guests attended the reception, and after the formalities were over, Clarence P. Wynne, president of the club, called upon several of the more distinguished guests for short addresses. The first of these was Lieut. Porte, who spoke very confidently of the prospects of their meeting with success in their undertaking. During the course of his remarks he referred to the fact that many people spoke of the flight as being impossible, while others stated that it was perfectly easy. As a matter of fact, Lieut. Porte looks upon it from neither of these extremes, but considers it a difficult undertaking, which can be accom plished.

Among other speakers were Si Wilfred Powell, British Consul General at Philadelphia; Captai William S. Benson, commandant o the Philadelphia navy yard; Georg S. Bliss, director of the Philadelphi Weather Bureau, and Will Gash of the Aero Club of America. A special reception committee, con sisting of Walter S. Wheeler (chair man), Robert Kelse Cassatt, Jame Spear, Arthur Wheeler and Marsha Earl Reid, had charge of the af fair, and prior to the reception thi committee gave a dinner at th Racquet Club, at which they enter tained as guests Lieut. John C Porte; Clarence P. Wynne, presi dent of the Aero Club of Pennsyl vania; Will Gash, of the Aero Clul of America; John Wanamaker, Jr. and M. F. Bergen, Esq.

The reception was one of the most successful functions that has been held by the Aero Club of Pennsylvania, and it is likely that affairs of this kind will frequently take place in the future, and at each of which some person notable in aviation will be the guest of honor.

MECHANICAL ENGINEERS' MEETING

The spring meeting of the New Haven Section of the American Society of Mechanical Engineers was held in the Mason Laboratory of Mechanical Engineering, Sheffield Scientific School, on Friday afternoon and evening, May 1st. The Committee on Meetings, consisting of Mr. E. S. Cooley (chairman), Professor E. H. Lockwood (secretary), Professor L. P. Breckenridge, Mr. H. B. Sargent and Mr. F. L. Bigelow, arranged for a program dealing with the subject of "Aeronautics and the Internal Combustion Motor." The meeting was largely attended by local engineers, and by President James Hartness and Secretary C. W. Rice of the society.

Mr. John J. Long, of Brown University, Providence, R. I., read an illustrated paper on "A Review of Aeronautical Progress." The "Proportions of Propellers and Engine Cylinders" were discussed by David L. Gallup, Professor of Gas Engineering, Worcester Polytechnic Institute, Worcester, Mass. A paper on "Fuels for Internal Combustion Engines" was read by Mr. D. B. Pangburn, of the Mechanical Engineering Department. A letter was read from Mr. Evarard Thompson, of the Connecticut Aeroplane Company, who was unable to attend the meeting. Mr. Joseph A. Steinmetz, of Philadelphia, talked about the "Aircraft in War, for Offense and Defence."

A 100-h.p. Gnome motor was on exhibition in the laboratory, having been loaned for the meeting by Mr. Edson F. Gallaudet, Yale '93, of Norwich, Conn.

Mr. Howard Huntington read an illustrated paper on "Internal Combustion Motors in the Field of Aviation."

AERO SCIENCE CLUB

On May 10th, at Governor's Island, Louis A. Fenouillet made some thirty towed flights in his biplane glider, ranging from 200 to 1,000 feet, in the presence of Brigadier-General R. K. Evans.

VOL. XIV. No. 10 MAY 30, 1914 dHC 15 Cents

AERONAUTICS

WITH WHICH IS COMBINED **FLY**

Official Organ and Bulletin—Aero Club of Pennsylvania
The Aeronautical Society

Are you tied to good roads with a motor car?
Or shackled to smooth water with a put-put?
Why not cleave the air faster than the birds, free from rough waves or rutty roads in a

Curtiss Flying Boat

NO king ever enjoyed such sport as this. Four to five hundred miles without pause, at a speed of more than a mile a minute. :: :: ::

FIVE hundred thousand passenger miles without one serious accident. Used by six Governments and by private owners nearly everywhere. ::

During the past three years **Curtiss Water Flying Machines** in the U. S. and foreign navies have flown hundreds of thousands of miles without accident. The confidence engendered by this record must be reflected by the work of our navy fliers in Mexico.

After using them for thousands of miles of flight, **Curtiss Flying Boats** have the endorsement of Mr. Harold F. McCormick, Commodore Wm. E. Scripps, Mr. J. B. R. Verplanck, Mr. Gerald Hanley, Mr. William Thaw, Mr. Logan A. Vilas, Mr. William A. Dean, Mr. Barton L. Peck, Mr. Raymond V. Morris, and many others.

One Demonstration Will Convince the Most Skeptical

Write us for illustrated literature or to arrange for a demonstration flight. DO IT BEFORE IT IS TOO LATE.

The Curtiss Aeroplane Co.

21 LAKE STREET
HAMMONDSPORT, N.Y.

TECHNICAL TALKS—By M. B. Sellers

THE SLIP STREAM AND THE ANGLE OF ATTACK

I shall consider, in a qualitative way, some phenomena of the slip stream, and of the angle of attack of an aeroplane propeller.

At first, in order to simplify matters, we will imagine a propeller of uniform pitch and negligible thickness, rotating in a short tube which just clears it, on a shaft concentric with the tube.

The immediate effect of the propeller's rotation will be a rarification or depression to windward, and a compression to leeward. Air will be driven into the tube by the excess pressure of the outside air. Air will flow to the entrance of the tube from all directions, just as water would flow to a tube sticking up in the bottom of a vessel of water.

The compression and depression will be in proportion to the resistance overcome in moving the air, and the propeller thrust on its bearings will be in proportion to this compression and depression (and not to the volume or weight of the air in motion).

If now the propeller speed is *kept constant,* and the tube (together with the propeller system) is moved endwise (propeller advancing), the effort required to keep the air in motion will diminish, the compression and depression will be lessened, and, the thrust of the propeller against its bearings reduced. Finally, if the advance of the tube equals the pitch speed, there will be no compression and depression, no thrust, and no converging flow at entrance to tube.

The mean relative speed of the air in the tube will be the pitch speed of propeller, less a certain deduction (for backward flow through the blade circle). This deduction will be less the less the compression required to move the air, and therefore less, the greater the speed of advance of the tube.

For a constant propeller speed, the relative air speed in the tube will not differ greatly, whether the tube is advancing or standing.

Where the advance of the tube equals the pitch speed, the air entering the tube will not be in motion relative to the surrounding air, but as soon as the advance becomes less than the pitch speed the entering air will be set in motion, and this actual motion will, of course, be greater, the slower the advance of the tube.

We have been considering an ideal propeller of uniform pitch and negligible thickness. An actual propeller with cambered blade, or rounded blade back, will give a greater air speed for the same rotative speed. A propeller with cambered back and zero pitch will produce an air current through a stationary tube (and incidentally a thrust); and one having a short pitch will produce a current greater than the pitch speed. Evidently the angle of attack of the blade will here be negative.

Now, remove the tube, allowing the propeller to rotate in the open. The convergent flow which occured at the entrance of the tube will now take place at the propeller. The air leaving the propeller will converge somewhat (*vena contracta*).

As in the case of the tube, the speed of air leaving the propeller may be equal to, or greater than, the pitch speed. The air approaching the propeller, when at some distance from it, will move more slowly, but where it reaches the blades, will have sensibly the same speed as the air leaving them. The blades will, therefore, meet air having this rapid motion, and the angle of attack will be small and may even be negative.

A rotating propeller, whether advancing or standing, always encounters air in relative motion axially, and its angle of attack is always small and may even be negative. Thus, it evidently does not resemble an aeroplane wing, which encounters the air at its full angle of inclination.

A propeller advancing sets the air ahead of it in motion toward it, and so long as there is slip, there will be a slip stream, approaching as well as leaving the propeller.

It is customary to consider the angle of attack of an advancing propeller as equal to the slip angle. This would assume that the propeller encounters air at rest; whereas, so long as there is slip, the propeller acts on air already in motion.

It would seem, therefore, that we should choose for a propeller blade only those profiles having a high efficiency at very small angles of attack.

WRIGHT LICENSES GRANTED.

The first license for exhibition flying was granted to Lincoln Beachey by the Wright Co. on May 23. Charles F. Niles, of the Moisant International Aviators, was also granted one. The cost of license is merely nominal to an aviator, who, according to the correspondence schools, makes all the way up to $50,000 a year, it being $1,000 a calendar year and $25 for every day of paid flying.

It would be more or less natural to suppose that those who have taken out licenses will be protected by the enjoinment of unlicensed pilots.

Mr. Howard M. Rinehart, chief instructor at the Wright school, gave Messrs. Chas. R. Day and Nicholas Roosevelt each a 20-minute passenger flight, at several hundred feet altitude, on one of the Wright school machines, equipped with the new type elevator, during the week ending May 22. Both expressed considerable amazement at the steadiness of the machine and the feeling of security while they were in the air, which readily led them to become enthusiasts in the new art.

The instruction of pupils continues with steady, business-like progress. Mr. Rinehart is already piling up a mileage of considerable magnitude, and the pupils, particularly Earl Utter of Columbus Junction, Iowa, are doing splendidly. Mr. Utter has practically completed his tuition, having entered the school May 11, and is making splendid volplanes with motor cut off, and excellent landings.

Mr. J. G. Kloeckler, the Wright flyer, recently had completed at the Wright plant a new type "C" four-cylinder machine, finished in battleship gray and treated linen, which gives a very smart appearance, and which, when sent out to the field for its tests, caused much favorable comment. Mr. Kloeckler is to use this machine for a series of exhibition flights in the near future.

At the Dayton factory there is a hum of work on the new machines. The navy airboat returned from its complete and successful trials at Toledo, in the hands of Harry N. Atwood, and is being cleaned up preparatory to reshipment. And they are under way, as well as the new type ordered by Atwood for his work at Toledo is practically completed, and will be delivered in a few days. Several other aeroboats are under way, as well as the new military machines and much experimental matter of Mr. Wright's.

BROOKINS BACK.

Walter Brookins, in partnership with Ralph Newcomb, rebuilt the Fowler transcontinental Wright, making wings rigid, aileron stabilizers hinged to rear beams, and Walter has a year's contract with a motion picture concern and with a resort at Venice, Cal. The ailerons are kept normally at a slight negative angle, and the machine spirals equally as well as it did when first new.

KNABENSHUE AIRSHIP MAY SAIL OVER NEW YORK.

Roy Knabenshue may bring his 10-man dirigible to New York in a couple of months ,after finishing an engagement at Chicago. The expenses to be covered are the erection of a shed and $1,000 a week for 10 weeks. The ship has been in operation in Los Angeles and vicinity since August of last year; has made hundreds of trips with passengers, and was not deflated until the 1st of May, when it was packed to ship to Chicago. (See AERONAUTICS, Nov., 1913.)

AVIATION IN FRANCE.

The figures of French aviation are startling, even to the close observer. For the past year (1913), 13,010,000 kils. were flown; the duration was 133,800 hours; cross-country flights were 23,600; passengers to the number of 47,900 have been carried.

Some 1,148 aeroplanes were constructed (as against 1,423 in 1912), 146 hydroaeroplanes and flying boats, 14,000 propeller, 2,240 motors. The power of motors put in French aeroplanes totaled 89,000. The total power of all French-built air motors was 228,863. Three hundred and eighty four pilot certificates were given, against 489 in 1912.

ORIGINAL LANGLEY MACHINE FLIES

Hammondsport, N. Y., May 28.—The Langley "aerodrome" flew a short distance to-day, fitted with three floats, using original engine.

In the interest of aeronautical history and of aerotechnical science, the large tandem monoplane of Dr. Langley has been restored to its original completeness at the Curtiss factory, at Hammondsport, N. Y., and after some tests of its efficiency and stability, will be returned to the Smithsonian Institution for permanent exhibition.

Quarter Size Model in Flight, Aug. 8, 1903

It has been a source of regret to students of aviation and to visitors to the Smithsonian Institution, that the Langley passenger machine was never completely tested and never exhibited in the museum with its successful prototype, the quarter-scale gasoline model which, in August, 1903, flew with good automatic equilibrium above the Potomac River, at Widewater, Va. As this model is the first gasoline-driven aeroplane in history, so the large machine, patterned after it, is regarded by aeronautical engineers as the first passenger aeroplane of adequate stability and power for prolonged free flight in moderate weather.

This famous machine, since the accident in its launching, on December 8, 1903, has been stored in the Smithsonian Institution in dismantled form and inaccessible to visitors generally. When, therefore, Mr. Curtiss expressed the wish to restore its wings to the otherwise perfect aeroplane, and make a brief test of it before returning it for exhibition, he was authorized to do so. Accordingly on April 2, 1914, the frame and accessories were shipped to the Curtiss flying field at Hammondsport. Official tests are expected to be made May 30.

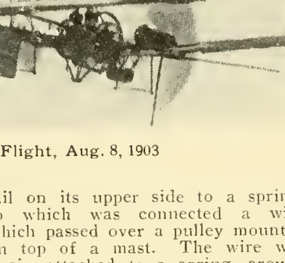
No changes have been made in the balance or general design of the machine. It has, however, been equipped with three shallow pontoons to keep it afloat on the water.

DESCRIPTION OF MACHINE.

The Langley full sized machine was designed along the lines proven so successful in the power flying models to secure (1) highly stable initial equilibrium, (2) automatic means for maintaining this equilibrium under the varying conditions of flight and for restoring it if disturbed, and (3) provision for manual control.

For structural reasons the c. of g. was practically in the same plane with the line of thrust, being about 1 cm. above it, and the c. of p. was about 1 cm. in front of the horizontal c. of g.

The flying models demonstrated the efficiency, for longitudinal stability, of the automatically operating Penaud tail, attached to the rear of the frame of the machine through an elastic connection and normally set at a negative angle. This tail had rigid vertical and horizontal surfaces of 95 sq. ft. each. A bridle ran from the center of the tail on its upper side to a spring, to which was connected a wire which passed over a pulley mounted on top of a mast. The wire was again attached to a spring, around the two ends of which it formed a loop, and from there it passed down to the main frame and through pulleys to the control wheel at the aviator's right hand. From there the wire passed through pulleys to the rear end of the machine and over a pulley at the bottom of a mast to a weaker spring, the other end of which was connected by a second bridle to the under side of the tail at the center. The wire was made continuous around the springs so that if the springs were extended by 50 per cent. the additional strain came on the wire loops. The control wheel for the tail would automatically lock itself in any position in which the aviator placed it.



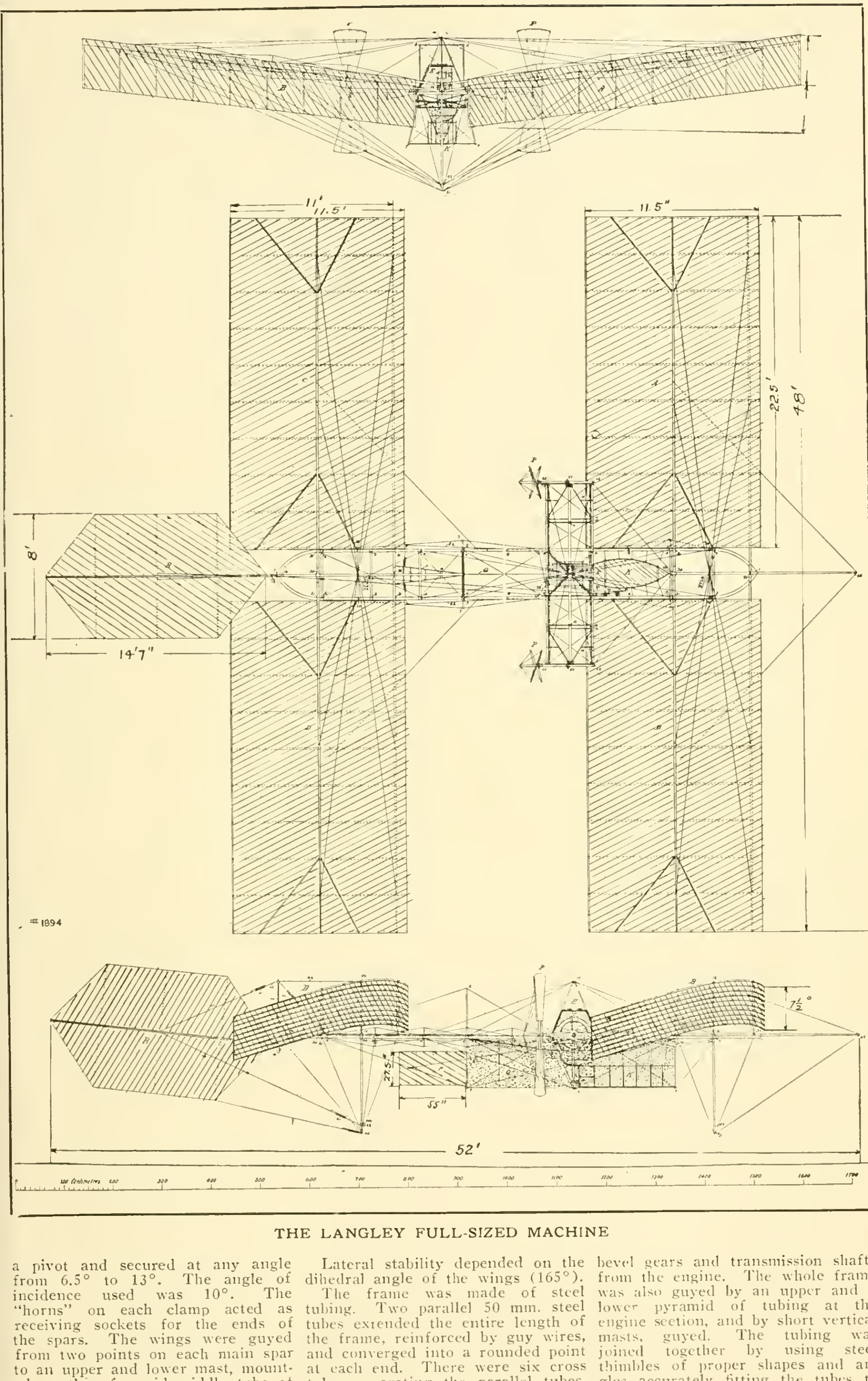
Steam Model No. 5 in Flight
May 6, 1896

A movable vertical rudder of 10 sq. ft., was arranged independent of the tail, as shown in the drawing. To operate this another wheel was placed at the aviator's right hand, springs being interposed in loops of the control wires. Lateral stability was expected to be provided by setting the wings at a dihedral angle of 165 degress.

Each wing weighed 29 lbs., measured 22.5 ft. by 11.5 ft. chord, a total of 260 sq. ft. The total supporting surface of the machine was 1,040 sq. ft. and equipped for flight the whole machine, including pilot, weighed 850 lbs., or 1.22 ss. ft. to the lb., or 0.82 lbs. to the sq. ft. The front beam, middle and rear lateral spars were hollow, the front and middle being round and the rear D-shaped, tapering from the center of the wing outward but with the thickness of the walls unchanged. Blocks were glued in the middle spar where the ribs were attached.

The ribs were made in the form of a hollow square, with sides of tapering thickness, the thickest part being midway the sides, with small partitions every few inches. The curve was 1 in 18 with the highest point of curvature 0.25 from the front edge. The cloth covering was permanently fastened to the front beam, to which were attached the front extension pieces by metal clips secured by small wood screws. On the rear edge of the front main beam, at a uniform distance of 30 inches apart, 10 small metal horns were fastened by a clamping thimble. The front end of each of the ribs was slightly rounded out to fit the front main beam, and in the wooden block which was glued in this end of the rib a hole was bored to fit these horns. Each of the ribs was then pushed over its proper horn and against the front main beam, and the cloth covering then drawn back toward the rear tips of the ribs. In the extreme rear edge of the cloth covering a seam was made, and in this was inserted the rearmost "D" rib. The cloth was then tightly stretched and a wood screw forced through the "D" rib and into and through the metal ferrule at the tip of the cross-rib. Near the inner and outer edges of the cloth covering eyelets were placed, through which small cords were then inserted and tied to the end ribs. The main middle beam was then placed on top of the ribs and fastened to them with wood screws, and the cross-braces were then fastened on the top of the wing, as shown in the scale drawing. The frame of the wing was stiffened horizontally by cross guy-wires which passed from each rib, at the point where the middle beam crossed it, to the adjoining rib, at the point where it was connected to the front beam. Each of the main beams was individually guyed to masts as shown in the scale drawing. Finally, small guy-wires were run from the front end of the ribs over a guy-post 12" high at the point where the ribs crossed the middle beam to the rear tip of the rib. These cross guy-wires were regulated in tightness by raising and lowering a screw in the slot of the head of which they rested, and which was threaded in the end of the small guy post. Upper and lower guy wires, running from the main beams to the guy-posts on the frame, as already described, and as is clearly shown in the drawings, completed the guy-wire system for the wings, except for the "draft wires," which for the front wings were run from the lower side of the middle beam to the bow-sprit at the front of the machine, and for the rear wings to the main frame.

The front and middle main spars of the wings were secured to the steel tubes, running fore and aft in the main frame, by clamps, so constructed that the wings could be rocked about the middle spar as



THE LANGLEY FULL-SIZED MACHINE

a pivot and secured at any angle from 6.5° to 13°. The angle of incidence used was 10°. The "horns" on each clamp acted as receiving sockets for the ends of the spars. The wings were guyed from two points on each main spar to an upper and lower mast, mounted on the aforesaid middle tube of the frame.

Lateral stability depended on the dihedral angle of the wings (165°).

The frame was made of steel tubing. Two parallel 50 mm. steel tubes extended the entire length of the frame, reinforced by guy wires, and converged into a rounded point at each end. There were six cross tubes separating the parallel tubes. A transverse frame supported the bevel gears and transmission shafts from the engine. The whole frame was also guyed by an upper and a lower pyramid of tubing at the engine section, and by short vertical masts, guyed. The tubing was joined together by using steel thimbles of proper shapes and angles accurately fitting the tubes to be joined, and brazed.

The use of one engine to drive two propellers mounted at opposite ends of the transverse frame, and in a direction perpendicular to the crankshaft, necessitated the use of a pair of bevel gears between each propeller shaft and the shafts transmitting power from the engine's crankshaft. Special "propeller-shaft bed plates" were made to insure rigidity of the transverse frame. The crankshaft was connected directly to the inner ends of the transmission shafts.

The transmission shafts and propeller shafts were made of steel tubing, 1.5″ in diameter, with walls .125″ thick. Bevel gears drove the twin propellers, the driving gear having 31 teeth and the driven gear on the propeller shaft 40 teeth. All the shafts were mounted in ball bearings.

The propellers were made by inserting wooden arms 1.5″ diameter at the hub end, tapering to 1″ at the end of the blade, in steel tubes which fitted over the horns in the hub, which latter was made of steel tubing. The wooden arms were then covered with canvas. The bending moment produced on the blade by the thrust was taken up by guy wires running from the corners of the blades to a post projecting from the hub of the propeller. The propellers were 2.5 metres in diameter, unit-pitch ratio, 30 degree blade width.

The aviator's "car" was shaped like a flat bottom boat and was placed directly in front of the engine. This was supported by guy wires from the main frame. A light wooden seat extended fore and aft the car.

The engine was a 5 cylinder, 4 cycle, designed by Chas. M. Manly and ran, on three occasions, ten consecutive hours, producing 52.4 h.p. at an average speed of 950 r.p.m., for a total weight of power plant, including, of course, the radiator, water tank, water pump, gasoline tank, fly wheel, spark coil and batteries, of 187.47 lbs, or 3.57 lbs. per b.h.p.; weight lifted per b.h.p., 162 lbs. The bore and stroke of this engine was 5″ by 5½″. At this time there was not an American automobile on the market and only a very few heavy gasoline power plants in existence. The engine was made entirely of steel except the bronze bushings for the bearings, the cast iron pistons and cast iron liners of the cylinders. The cylinders consisted of a main outer shell of .0625″ steel, with a flange brazed at the bottom for bolting to the crank case. These shells were seamless with the heads formed integral. The cast iron liner was .0625″ thick and was shrunk in. The combustion chamber, which entered the side of the cylinder near the top, was machined from a solid steel forging and was brazed to the cylinder. The sheet steel, .020″ thick, water packets were also brazed to the cylinders. All five connecting rods operated on one crank pin, each provided with a full amount of bearing area. Lubrication was from an oil cup through grooves in the bushing, through the hollow crankshaft and to the hollow crank pin. There were also small holes through the crank pin. The other four connecting rods were oiled by the oil fed to the main connecting rod. The pistons were lubricated by the oil thrown off from the crank and by means of small oil cups fastened to the outer walls of the cylinder which distributed the oil through small holes in the cylinder walls.

The pistons had two deep but thin ribs reinforcing the head. The pistons were slightly tapered from the middle, where they were .005″ smaller than the cylinder bore, toward the outer end, where they were .0075″ smaller than the bore. The outer piston ring was .0035″ narrower than its groove, the second one .003″, the third .0025″, and the inner one .002″ narrower than its groove. The rings were bored 1/16″ off center with the exterior surface, and had ⅛″ diameter of spring. They were of the lap-joint type, with the sides of the lap carefully fitted and only 1/64″ clearance at the ends of the laps to allow for thermal expansion. The cylinders were carefully bored smooth and free from taper, and the pistons were worn in to a perfect fit by running them in by a belt for 24 hours, with copious oil supply.

The main connecting rod was ⅞″ diameter and solid, while the other four were of the same diameter but with a ⅝″ hole in them. The gudgeon pins in the pistons were hollow steel tubes ⅞″ diameter and case-hardened, and were oiled entirely by the oil thrown off by centrifugal force from the crank-pin bearing, the oil running along the connecting rods and through suitable holes at the heads into oil grooves in the bronze bushings in these heads.

The inlet manifold consisted of a 50 mm. tube bent to a circle and having five branch tubes, each leading to one of the automatic inlet valves, which fitted removable cast-iron seats fastened by a nut in the upper part of each combustion chamber. The carburetor, which was especially designed, which was placed near the rear of the aviator's car, was connected through a suitable pipe to this circular inlet pipe.

The cooling water was supplied by a centrifugal pump. The heated water was led from the jackets to the radiating tubes at the front and rear, respectively, of the cross-frame. These radiating tubes, which were provided with thin radiating ribs soldered to them, finally led the cooled water to the tank situated in the extreme rear of the aviator's car, a suitable pipe from the bottom of this tank being connected to the pump.

The sparking apparatus comprised, first, a primary sparker similar to the simplest form of such devices which have since come into common use. As this sparker was used for all five cylinders, the cam was driven at a speed of two and one-half times that of the engine shaft. Second, a spark coil, the primary terminals of which were connected to the primary sparker and to a set of dry batteries. Third, a secondary distributor consisting of a disc carrying a contact brush and driven at a speed one-half that of the engine, this brush being constantly connected through a contact ring to one of the terminals of the high-tension side of the spark coil and running over the face of a five-section commutator, each of the sections of which was conected to a spark plug, the other high-tension terminal of the spark coil being, of course, grounded on the engine frame. The plugs and coils were also especially designed by Mr. Manly for the work, there being nothing suitable on the market.

In the shop the engine showed 480 lbs. thrust, which has also been obtained at the Curtiss factory.

SAMUEL PIERPONT LANGLEY.

Professor Langley was secretary of the Smithsonian Institution, 1887-1906. Though his fame rests primarily on researches in solar physics, his name is best known to the world by his experiments in mechanical flight. He was the first to produce a gasless heavier-than-air machine which, supported and propelled by its own engine and possessing no extraneous lifting power, actually made an independent flight for a considerable distance.

He gave to physicists firm ground on which to stand, as to the long disputed questions of air resistances and reactions. He established a more reliable (a) coefficient for rectangular pressures than Smeaton. He proved (b) that upon inclined planes the air pressures were really normal to the surface. He disproved (c) the "Newtonian Law" that the normal pressure varies as the square of the angle of incidence on inclined planes. He showed (d) the ignored empirical formula of Duchemin approximately correct; that (e) the position of the c. of p. varied with the angle of inclination, and that on planes its movements approximately followed the law formulated by Joessel; that (f) oblong planes, presented with their longest dimension to the line of motion, were more effective for support than when presented with their narrower side; that (g) planes might be superposed without loss of supporting power if spaced apart certain distances, which varied with the speed; and (h) that thin planes consumed less power for support at high speeds than at low speeds—called "Langley's Law." "It is true only if the plane alone be considered and it leaves out of reckoning head resistance of framing, hull, etc."

Always interested in bird flight, Professor Langley became actively interested in flight through reading, in 1886, a paper of Israel Lancaster, who is known to older readers of AERONAUTICS. He began in 1887 experiments with a whirling table and this was used three years in making experiments published in "Experiments in Aerodynamics," by the Smithsonian in 1891. Many experiments with birds were conducted and with rubber-driven models up to 1893 inclusive.

In 1891 a steam-driven model was started but in 1892 it was abandoned without field trials. Three other, either driven by steam or carbonic acid gas, were made but not flown. By 1893 another was well under way and various experiments with boilers and burners conducted. On November 20, 1893, the power model number 4 was launched but fell in the water due to the defect of the launching

apparatus. Other trials were made but were unsuccessful in launching.

In 1895 other experiments continued with No. 4 and a flight of 130 feet was obtained.

On May 9, 1895, a short flight was made with model No. 5 and trials continued with this throughout the year.

On May 6, 1896, No. 5, which had been variously altered, flew a distance of 3,300 feet and a second of 2,300. These were the first big flights made with the steam-driven model. The other successful model, No. 6, on November 28, 1896, flew some 4,200 feet.

The early part of 1898, after a report of an investigating board, the Board of Ordnance and Fortification of the War Department, alloted Dr. Langley $50,000 for the construction of a full sized machine, which allowance was influenced by President McKinley, who was greatly interested in the possibilities of a flying machine as an engine of war. William Thaw had also given Professor Langley $5,000 to be used as he liked, and it was employed in aeronautics. It was realized that the greatest difficulty was the obtaining of a suitable gasoline engine. By the end of 1899 the full sized machine was complete except for the engine, and various experiments were renewed and a launching apparatus designed, while waiting for the engine. During this time a quarter sized model of the big machine was built, flights were continued with the models Nos. 5 and 6, and a new bigger house boat was built to carry the launching device for the big machine. During this time, also, Mr. Charles M. Manly designed an automatic stabilizing apparatus, using a pendulum and "servo" motor, but was never tried in any machine, owing to lack of time.

The engines originally constructed by outside parties for the large machine and for the quarter sized model, and which were the first rotary engines designed for aeronautical work, proved worthless on test in 1900 and a visit to Europe failed to produce any builder to undertake the construction of others. It was seen that an engine must be built in the Smithsonian shop and an experimental engine was tested on September 18, 1900. This gave 21.5 h.p. and weighed 120 lbs. Another and larger engine was started and the first tests were made in January, 1902. A description of it is included in this article. Mr. Charles M. Manly, who was associated with Prof. Langley during all these experiments, designed this engine as well as the experimental one and the one which was also built for the quarter size model. All of these three engines were of the stationary cylinder type.

The quarter sized model was an exact duplicate of the big machine and its first flight was made on June 18, 1901. The flight was very short, 350 ft. New cylinders for this engine were built and attention was then turned to the big machine so that no further flights were made until August 8, 1903.

It then flew a total distance of 1,000 ft. and maintained perfect stability. The flight was cut short at this distance by reason of too rich a mixture. The variation in pressures against the surfaces operated the Penaud tail so that the machine automatically maintained horizontal flight.

TRIALS OF THE BIG MACHINE.

The big machine was then installed on the top of the new big house boat which had been built and after many exasperating delays it was ready for its first flight on October 7, 1903. Mr. Manly took his seat, started the engine himself and the machine was released. Just as it left the track the front guy post caught on the launching car, twisted the front surfaces to a negative angle and caused the machine to plunge head first into the water with the full power on. Mr. Manly was fortunate in being able to clear himself from the guy wires and the wrecked front wings.

After completing repairs on the machine and waiting for good weather another attempt was made on December 8, 1903, when the river was filled with ice. The funds appropriated by the War Department had been exhausted for two years and the expense since then had been met with a special fund of the Smithsonian. No other funds were in prospect, there had been so many criticisms of the work that it seemed to be a case of now or never. Mr. Manly again essayed the flight. Again apparently the rear guy post seemed to catch somewhere and the front of the machine shot up in the air. Mr. Manly endeavored to operate the tail but obtained no response. The fact was that the whole of the after part of the machine had been wrecked before it left the launching car. The machine climbed to a vertical position and was blown backwards in the water. Mr. Manly was caught in the framework under the machine. He tore loose the cork-lined jacket and dove from under the machine. His head came in contact with a floating cake of ice and he dove again, this time coming up clear.

The officers who were present at both tests reported far from pessimistically but the Board of Ordnance and Fortifications refused to furnish further assistance to the work for fear of their entire appropriation for experimental work being cut off. Dr. Langley desired to continue but the bitter criticism of the newspapers and even on the floors of Congress prevented the obtaining of any further funds.

The flights of the 1907 Bleriot V machine, which was patterned after it, confirmed the conviction that the Langley machine would have flown had it not been injured in launching.

MACCAULEY FLIES TORONTO-HAMILTON.

On May 15th, Theodore MacCauley, the altitude record holder, flew the hydroaeroplane owned by W. A. Dean, of Toronto, from that city to Hamilton, a distance of about 40 miles, at an average speed of over 70 m.p.h. He made several passenger flights around the city and returned to Toronto in the evening, carrying a passenger each way. The Hamilton people carried were: A. C. Lindgren and H. H. Biggert, of the International Harvester Co.; Mrs. L. Zimmerman, wife of an Oliver Plow official, and R. Robinson, sporting editor of the Hamilton *Spectator*.

AT SAN DIEGO.

Flying at the S. C. Aviation School for the week ending May 9, 1914, totalled 33 flights; 3 hrs. 46 min. in air; 6 passengers carried.

Summary, Jan. 1 to May 9, 1914: 1,006 flights; time in air, 266 hrs. 31½ min.; passengers carried, 479.

For the week ending May 16, 1914: 21 flights, 5 hrs., 48 mins.; 17 passengers carried.

Summary, Jan. 1 to May 16, 1914: 1,027 flight, 272 hrs., 19½ mins., 496 passengers carried.

NEW COMPANIES.

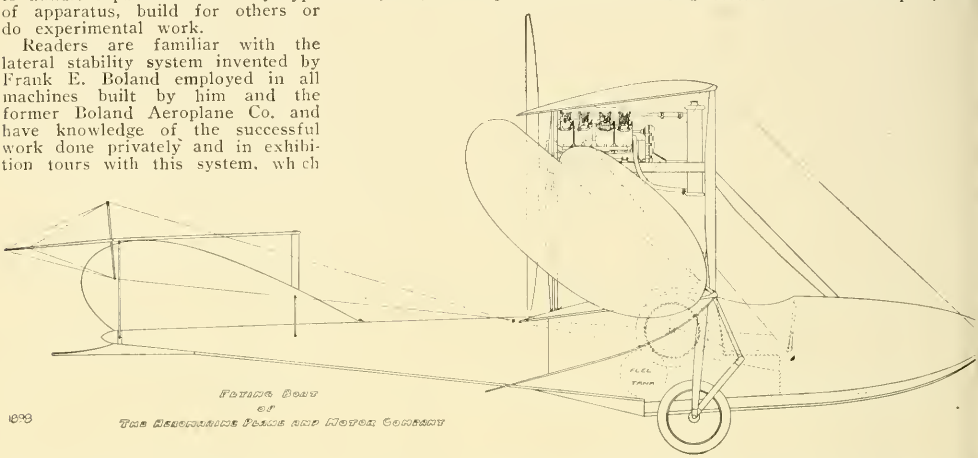
International Flying Co., airships, $50,000; Heinrich Schupphaus, Gustav Schug, Bernard Brinkmann, 233 Broadway, New York.

NEW BOLAND FLYING BOAT.

Announcement is made of the formation of the Aeromarine Plane & Motor Co., of Avondale, N. J., exclusive manufacturers under the Boland patents.

A new and large factory has been acquired at Nutley, N. J., which is equipped with every kind of machinery and every needful tool which can be employed in the improvement of aeronautical construction. The company is well equipped to handle repair work on any type of apparatus, build for others or do experimental work.

Readers are familiar with the lateral stability system invented by Frank E. Boland employed in all machines built by him and the former Boland Aeroplane Co. and have knowledge of the successful work done privately and in exhibition tours with this system, wh ch



has been used on tailless machines, standard types, monoplane water machine and the new machine now being marketed, which is the embodiment of all these years of experiment and testing.

The illustration shows the latest machine, fitted, of course, with the Boland "jibs," which are claimed to be non-infringing. The flying boat follows proven lines in all respects. The forward bottom is V-form in cross-section, spruce ribs spaced 5 and 6 inch centers and canted to correspond with fore and aft curve of bottom; planked with two ¼ inch courses of selected cedar, inside skin laid diagonal, outside fore and aft with sheeting laid in Jeffery's marine glue between courses, well screwed to ribs with brass screws and quilted with copper rivets clinched over copper burrs.

The general framing consists of fore and aft members of ¾″ by ¾″ spruce so spaced that they also form seam battens for the outer skin. Transverse framing consists of select ash ribs 5/16″ by ⅝″ spaced from 4″ to 6″, according to stress distribution, steam bent and fastened with non-corrosive fastenings. Transverse bulkheads, consisting of two or three skins laid diagonally with canvas interlayers and well quilted with copper tacks are introduced at four points, giving five water-tight compartments and also stiffening the frame.

Planking is of cedar. Inner skin spirally wrapper about the tail and running from chine to chine forward of the step is covered with sheeting laid in marine glue and an outer skin of cedar laid fore and aft. The whole is thoroughly quilted with copper tacks.

The hood sections are rounded so that they fair into the circular section of the tail with a minimum of eddy-producing shapes.

General dimensions of hull are: Length over all, 24′ 4″; greatest beam 41½″; greatest depth, 42″; estimated weight, 300 lbs.

The planes consist of an engine section or cell of 66″ and one-piece wings, each 18′ 4″ with outer corners rounded, chord 66″, 3 7/16″ camber; lifting surface, 435 sq. ft. The front main spar is 1½″ by 2″, select spruce, with leading edge rounded off. Rear main spar is 1″ by 3″, also spruce. Ribs consist of a web of laminated spruce with top and bottom strips forming an I-section. Struts, laminated spruce, spaced 66″.

The lateral control is by "jibs" placed 22″ in from outer ends of the main planes, pivoted at approximately 45 deg. and so connected that they operate independently. These jibs are used both for horizontal steering and for banking or maintaining lateral balance. Fore and aft control is by real elevator surface supported by the tail of the boat. Because of the strength and shape of the boat tail, the "empennage" is carried on framework attached with flush hoops entirely encircling the boat, making a very rigid structure with very little weight and having no openings through the skin of the boat.

The operation of both controls is simple. A rotary motion of the hand wheel pulls one or the other jib inward and a fore and aft movement of the steering column operates the elevator flaps. Steering on the water is accomplished by means of side plate rudders at the step.

The power plant is an 8 cyl. V water cooled motor, made by the same company, bore 4½″ by 5½″ stroke, direct connected to an 8′ propeller, 6′ pitch turning at 1,250.

The machine will also be equipped with a strong gear for land use, consisting of folding or disappearing wheels located just forward of the c. of g., and a flexible skid at the tail. The wheels are mounted with caster action and shock absorbers, best explained as of the Bleriot order, provided. The wheels are raised into a light wheel box of streamline form, above the water line. Lowering and raising is accomplished from the pilot's seat.

General dimensions: Over-all length, 26′ 6″; spread, 42′ 2″; heighth over all, 9′; gap, 66″; chord, 66″; surface, 435 sq. ft. weight with full load, 2,000 lbs.

The company also makes its own motors in 60, 70 and 100-125 sizes The Boland motor has continuousl been employed in all the machine and the makers are well satisfie with performances.

FLYING AT VERA CRUZ

The complement of aircraft a Vera Cruz has been enlarged b the addition of two Curtiss flyin boats and one hydroaeroplane whic had been located at Tampico, wit Lieut, Towers, Smith, Ensign Ch valier and ten men. The hydro ca be fitted with wheels and flown a a land machine.

On May 23 Lieut. Bellinger toc up Richard Harding Davis for trip about Vera Cruz and environ and in a flight the following da Bellinger was fired upon by Mex cans, although no state of war e: ists. Bellinger was flying ove Vergara, an American outpost. O the 25th Lieut. Smith flew over tl fleet in a trial flight.

The Burgess Company has denie the report that it is building thirt aeroplanes for the government, bu admitted that activity in the factor was due to the demand for part The Burgess army Renault-engine tractor had its first trials on Ma 15, with Capt. A. S. Cowan as pa senger, at Marblehead. Lieu Herbster and Constructor Richarc son are at Marblehead, where a se ond Burgess-Dunne especially de signed for naval work is being triec

---

Durango, Mexico, May 17.—Th vulnerability of war vessels to th attack of aeroplanes was demon strated, according to a message re ceived by General Carranza, whe the Federal gunboat Morelos, whic has been one of the effective de fences of Mazatlan against Const tutionalist attack, was forced to pu to sea with the upper works on fir to escape the bombs of the Const tutionalist aeroplane fleet.

The message, which was sent b General Alvardo Obregon, state that the bombs from an aeroplan bursting on the deck of the gun boat not only silenced the ship' guns, but also prevented the rifle men on board from firing effectively

A few days before many person were reported injured by bomb from the rebel 'plane in Mazatlar among whom were non-combatants

NEW CURTISS NON-INFRINGING.

As announced in the last issue, flights have been made at Hammondsport with an alleged non-infringing lateral control. It is presumed that the system employed is that in which the high side is depressed, without operating the aileron on the low side. No information is available, but the pictures of the new military machine and that of the twin-float tractor seem to indicate this system, the difference being particularly noticeable in the picture of the flying boat and the tractor in the air.


1896

The picture of the land machine is the latest military tractor delivered, fitted with the O-X 90-100 motor. A range of speed is claimed of from 40 to 80 miles an hour, with climbing speed of 3,000 ft. in 7 minutes.

AIRSHIP UP 36 HOURS.

Berlin, May 22.—The new Zeppelin airship L-3 made a very notable record to-day, in a non-stop flight of 36 hours, at an average of nearly 52 miles an hour. In one hour of the flight, when she had a favorable wind, the ship covered 93 miles. This is an unprecedented record for any dirigible.

The L-3 started from Friedrichshafen, on the Lake of Constance, and visited various places, including Heligoland. From that place to Berlin, where she landed in the evening, she averaged 68 miles an hour.

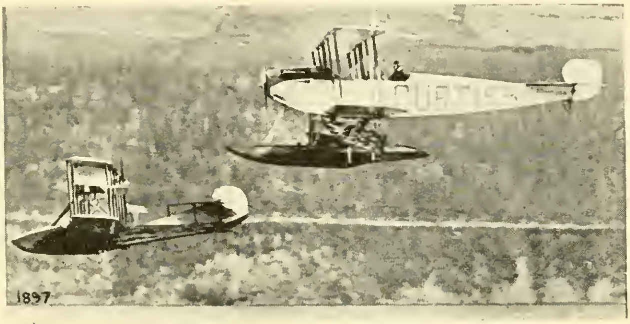
DO BODIES FALL?

Do bodies fall? It is a commonly accepted fact that bodies gravitate toward the earth. Robert Stevenson, of 604 West 115th street, New York tells the editorial department of this great journal that all this theory of gravitation is pure bunk—that the earth falls toward the bodies. Mr. Stevenson states he is prepared to prove his own theory to the satisfaction of any open-minded person, and would like to hear from those interested in discussing this.

IN MEMORIAM

Other clubs, to whom letters sent are returned by the Postmaster as "not found," are:

Oakland Aero Club.
Aero Club of San Diego.
Aero Club of Denver.


1897

NEW BOOKS

ANIMAL FLIGHT, a Record of Observation, by Dr. E. H. Hankin, the well-known authority on the flight of birds. 8vo, cloth, 404 pp., profusely illustrated, published by Iliffe & Sons, 20 Tudor street, London, E. C.

The book is likely to attract widespread interest in that it is the first systematic and authoritative account to be published of soaring flight.

Dr. Hankin's opportunities of observation of gigantic soaring birds having a span of wings of from 7 ft. to 11 ft., are described; and of bats having a span of 51 in. have been exceptionally wide.

Owing to the patience with which he trained his powers of observation, and to his careful avoidance of speculation, the facts brought to light by Dr. Hankin are both reliable and of great scientific value. His highly trained powers of observation are ilustrated by the discovery of the method by which a bird when diving at the rate of 100 miles an hour can suddenly check its speed.

On one page he describes a lifting of the hinder margin of one wing of a bird of 8-ft. span, which lifting must have been less than an inch, but yet which was noted and eventually explained. On other pages he describes his discovery of the method of steering from side to side employed by dragon flies, the extremely rapid movements by which a "cheel" catches food thrown to it while the bird is in gliding flight.

Perhaps the author's powers of observation are best illustrated by his curious discovery that dragon flies hold their hind legs in one or other of two positions during flight: one leg position used when the sky is clear, and the other leg position when thin cirrus clouds are present.

Among the many adjustments used by birds for modifying their flight which have been discovered by Dr. Hankin, the power of varying the camber of their wings is especially worthy of mention, which has also been claimed by R. R. Grant, whose aero stable machine has been described in AERONAUTICS.

Dr. Hankin's discoveries relating to soaring flight are likely to arouse much interest and discussion.

The book is written mostly in non-technical language, and the few technical terms employed are fully explained, both in a glossary and in foot notes to the text. The index is very complete and there are 98 illustrations.

INFLUENCE OF SIDE WIND ON VELOCITY AND DIRECTION OF FLIGHT

I. Angle of wind 30°

Velocity of flight in meters per sec.	5		10		15		20		25		30		35		40		45		50	
	A	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*
	°		°		°		°		°		°		°		°		°		°	
5	75,0	2,59	126,2	6,20	136,8	10,95	140,9	15,84	143,1	20,82	144,4	25,79	145,3	30,75	146,0	35,76	146,5	40,76	146,9	45,76
10	23,8	6,20	75,0	5,54	111,7	8,07	126,2	12,39	133,0	17,10	136,8	21,90	139,3	26,81	140,9	31,72	142,2	36,70	143,1	41,64
15	13,2	10,95	38,3	8,07	75,0	7,77	103,1	10,27	118,0	14,16	126,2	18,59	131,2	23,25	134,5	28,05	136,8	32,86	138,5	37,78
20	9,1	15,84	23,8	12,39	46,9	10,27	75,0	10,35	97,5	12,61	111,7	16,14	120,5	20,31	126,2	24,78	130,1	29,39	133,0	34,19
25	6,9	20,82	17,0	17,10	32.0	14,16	52 5	12,61	75,0	12,94	93,7	15,03	106,9	18,29	115,7	22,19	121,8	26,46	126,2	30,98
30	5,6	25,79	13,2	21,90	23,8	18,59	38,3	16,14	56,3	15,03	75,0	15,53	91,0	17,50	103,1	20,54	111,7	24,20	118,0	28,32
35	4.7	30,75	10,7	26,81	18,8	23,25	29,5	20,31	43,1	18,29	59,0	17,50	75,0	18,12	89,0	20,00	100.0	22,84	108,4	26,36
40	4,0	35,76	9,1	31.72	15.5	28,05	23,8	24,78	34,3	22,19	46,9	20,54	61,0	20,00	75,0	20,71	87.4	22,52	97,5	25,22
45	3,5	40,76	7,8	36,70	13,2	32,86	19,9	29,39	28,2	26,46	38,3	24,20	50,0	22,84	62,6	22,52	75,0	23,29	86,1	25,05
50	3,1	45,76	6.9	41.64	11,5	37,78	17,0	34,19	23,8	30,98	32,0	28,32	41,6	26,36	52,5	25,22	63,9	25,05	75,0	25,88

II. Angle of wind 60°

	5		10.		15		20		25		30		35		40		45		50	
	A	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*
	°		°		°		°		°		°		°		°		°		°	
5	60,0	5,00	90,0	8,66	100,9	13,23	106,1	18,02	109,1	22,90	111,1	27,84	112,4	32,80	113,4	37,76	114,2	42,72	114,8	47,70
10	30,0	8,66	60,0	10,00	79,1	13,23	90,0	17,32	96,6	21,79	100,9	26,46	103,9	31,23	106,1	36 06	107,8	40,94	109,1	45,82
15	19,1	13,23	40,9	13,23	60,0	15,00	73,9	18,03	83,4	21,79	90,0	25,98	94,7	30,42	98,2	35,00	100,9	39,70	103,0	44,44
20	13,9	18,02	30,0	17.32	46.1	18,03	60,0	20,00	70,9	22,90	79,1	26,46	85,3	30,42	90,0	34,64	93,7	39,06	96,6	43,59
25	10,9	22,90	23,4	21,79	36,6	21,79	49,1	22,91	60,0	25,00	68,9	27,84	76,1	31,22	81,8	35,00	86,3	39.06	90,0	43,30
30	8,9	27,84	19,1	26,46	30,0	25,98	40,9	26,46	51,1	27,84	60,0	30,00	67,6	32,79	73,9	36,06	79 1	39,70	83,4	43,59
35	7,6	32,80	16,1	31,23	25,3	30,42	34,7	30,41	43,9	31,22	52,4	32,79	60,0	35,00	66,6	37,76	72.2	40,94	77,0	44,44
40	6,6	37,76	13,9	36,06	21,8	35,00	30,0	34,64	38,2	35,00	46,1	36,06	53,4	37,76	60,0	40,00	65,8	42,72	70,9	45,82
45	5,8	42,72	12,2	40,94	19,1	39,70	26,3	39,06	33,7	39,06	40,9	39,70	47,8	40,94	54,2	42,72	60,0	45,00	65,2	47,70
50	5,2	47,70	10,9	45,82	17,0	44,44	23,4	43,59	30,0	43 30	36,6	43,59	43,0	44.44	49,1	45,83	54,8	47,70	60,0	50,00

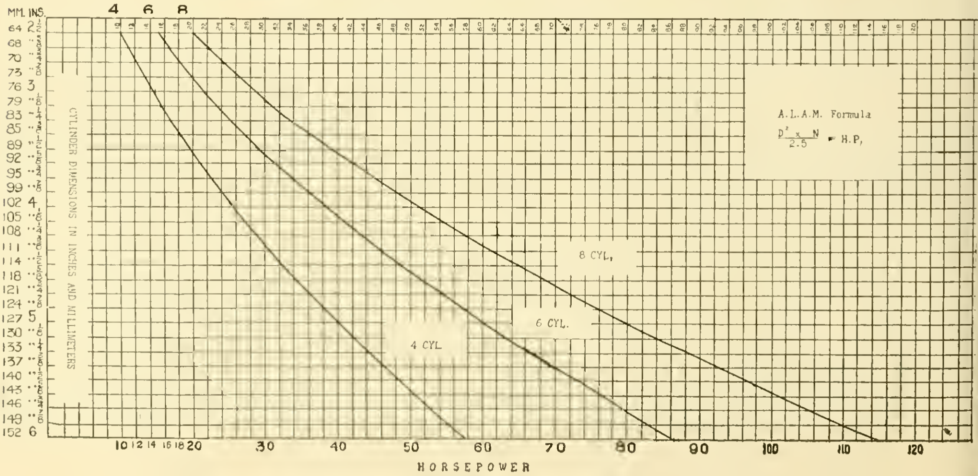
III. Angle of wind 90°

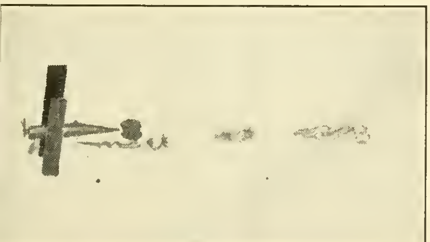
	5		10		15		20		25		30		35		40		45		50	
	A	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*	*A*	*E*
	°		°		°		°		°		°		°		°		°		°	
5	45,0	7,07	63,4	11,18	71,6	15,81	76,0	20,62	78,7	25,48	80,5	30,40	81,8	35,35	82,9	40,34	83,7	45,30	84,3	50,25
10	26,6	11,18	45,0	14,14	56,3	18,03	63,4	22,36	68,2	26,92	71,6	31,62	74,0	36,40	76,0	41,23	77,5	46,09	78,7	50,98
15	18,4	15,81	33,7	18,03	45,0	21,21	53,1	25,00	59,0	29,15	63.4	33,54	66,8	38,08	69,4	42,72	71,6	47,43	73,3	52,20
20	14,0	20,62	26,6	22,36	36,9	25,00	45,0	28,28	51,3	32,01	56,3	36,05	60,2	40,31	63,5	44,72	66,0	49,25	68,2	53,85
25	11,3	25,48	21,8	26,93	31,0	29,15	38,7	32,01	45,0	35,46	50,2	39,05	54,5	43,01	58,0	47,17	60,9	51,49	65,4	55,90
30	9,5	30,40	18,4	31,63	26,6	33,54	33,7	36,06	39,8	39,06	45,0	42,03	49,4	46,10	53,1	50,00	56,3	54,08	59,0	58,32
35	8,1	35,35	16,0	36,39	23,2	38,08	29,8	40,30	35,5	43,02	40,6	46,10	45,0	49.50	48,8	53,15	52,1	57,02	55,0	61,03
40	7,1	40,36	14,0	41,24	20,6	42,73	26,5	44,72	32,0	47,18	36,9	50,00	41,2	53,15	45,0	56,57	48,4	60,21	51,3	64,03
45	6,3	45,33	12,5	46,09	18,4	47,44	24,0	49,24	29,0	51,50	33,7	54,08	37,9	57,02	41,6	60,21	45,0	63,64	48,0	67,28
50	5,7	50,25	11,3	50,97	16,7	52,20	21,8	53,86	26,6	55,90	30,9	58,32	35,0	61,03	38,7	64,03	42,0	67,27	45,0	70,71

A=Change of course in degrees. E=Velocity of Flight in Meters per second with respect to the earth.
To convert into ft. per sec. multiply all velocities by 3.28

Side winds affect both velocity and the direction of flight. In the present tables A indicates the angle to which the direction of flight is changed for the angle of wind indicated at the top of the table when the aircraft moves at the speed shown in the vertical column to the left, while the speed of wind is that indicated in the horizontal column above the letters A-E. The figures under E indicate the velocity of the aircraft with respect to the ground under the above described conditions.

HORSEPOWER AT A GLANCE—A. L. A. M. FORMULA





29 West 39th Street, New York

OFFICIAL BULLETIN.

Next General Meeting.

The next general meeting will be held Thursday evening, June 11.

Herr Leo Kronau, director of the Austrian Airship Co., will deliver a lecture, illustrated with lantern slides, on "Progress in Dirigibles in Europe." Among the pictures are some remarkable photographs taken from spherical and dirigible balloons.

William Dubilier will address the members on "Wireless as Connected with Aeronautics," demonstrating a new system of his own. Mr. Dubilier has been demonstrating his system on aeroplanes in England. His talk will be illustrated with lantern slides.

At a later meeting, Mr. James Means will present a paper on his system of smoke signalling. The following general meeting will be on July 9th.

OFFICIAL BULLETIN

OFFICERS.

Clarence P. Wynne, *President.*
Jos. A. Steinmetz, *1st Vice-President.*
Wm. D. Harris, *2nd Vice-President.*
George S. Gassner, *Secretary.*
Laurence Maresch, *Treasurer.*

DIRECTORS.

Arthur T. Atherholt.	Harold H. Knerr.
H. F. Bamberger.	Wm. H. Sheahan.
Dr. Samuel C. Falls.	Walter S. Wheeler.

Office of the Club, Bellevue-Stratford, Phila., Pa.

A large number of members attended the meeting at Franklin Institute on May 20th, when the Elliott Cresson gold medal was presented to Orville Wright. Mr. Wright read a paper on "Stability of Aeroplanes," which will be pu lished in the Institute Journal a in AERONAUTICS. The Ae nautical Society of New York v represented by William J. Hamm

AERO SCIENCE CLUB.

Charles V. Obst, president; George Bauer, vice-president; Edward Durant, director and treasurer; Harry Schultz, secretary.

At the well-attended meeting on May 16 a very interesting talk on the "Baby" engine was given by Mr. Durant, assisted by A. M. Surini. The little engine was taken completely apart and thoroughly inspected by the members. Mr. Durant also explained and demonstrated his interesting electric gyroscope.

On May 22d the members paid a visit to the balloon factory of A. Leo Stevens. Mr. Stevens told them all he knew about balloon building, and they departed enthusiastic.

An intercity model contest is to be held by the club on May 30th, at Rugby Flying Grounds, Brooklyn. The Hand duration contest will be held from 10 a. m. to 12 noon; the R. O. G. duration contest from 2 p. m. to 4 p. m.; four valuable prizes for each event. Entries are expected from Concord, Boston, Schenectady and other cities. W. P. Dean, a noted English model flyer, will compete.

Club meetings are held every Saturday evening in the rooms of the Aeronautical Society, 29 West 39th street, New York. Dues are but $3 a year, including a year's subscription to AERONAUTICS. Branches may be established in any city. For full particulars address the secretary at this address.

"If you don't mind, sir," said the new convict, addressing the warden, "I should like to be put at my own trade."

"That might be a good idea," said the warden; "what may your trade be?"

"I'm an aviator."

ST. GEORGE'S AERONAUTICAL SOCIETY.

For the past three years the above society has been flourishing at Newport, R. I. Weekly meetings have been held, in which current events are brought up and discussed and debates held on topics of aeronautical interest. To further the progress and interest of the club, members have built models and competitions have been held regularly, with prize cups offered.

In these competitions rivalry has been very keen and records have been broken. The models have all been of simple construction, but very effective, as shown by the records for the last year, viz.: Duration, 112 2-5 seconds, by C. L. Poor, Jr.; for distance, 1,700 feet, by G. B. Larkin; and for this year, so far, duration, 63 seconds; distance, 1,960 feet, both made by Mr. Poor. The records are all official. A spring meet is to be held shortly, for which three cups have been offered as prizes. Negotiations are being made toward making the society a branch of the Aero Science Club.

BEACHEY LOOPING AGAIN.

Returning from France with a new 80 Gnome, Beachey began exhibition work at Chicago May 16-19. He repeated his performance in New York May 22-24. Barney Oldfield, with his Fiat "Cyclone" and the Christie front-drive racing cars, raced Beachey around the track at Brighton Beach, and Beachey cut capers in the air. He headed the machine straight up in the air and let it slide backward on its tail, he looped the loop, he flew straight up and then turned sideways and headed down to make what he calls a "cartwheel." His miniature machine he handled as accurately as a trick bicyclist his wheel. M and machine seemed one and divisible. Beachey is one of few "natural" flyers, according Orville Wright, and those who s him at Chicago and Brighton Bea agree fully. A description of machine, with Curtiss motor, v printed in the November, 1913, sue.

HAMEL LOST AT SEA

Gustave Hamel, the famous B ish aviator, left Villacoubl France, for Hendon with a n machine, which he was to use the race around London. There still no trace of him, and it is general belief that he has met similar fate to that of Cecil Gra who disappeared and was ne heard from. Last Fall Albert Je ell left Hempstead to fly to Oakla Heights to compete in the Ae nautical Society's race around M hattan, and no trace of him or machine was ever found.

HAY BILL PASSES HOUSE.

The Hay bill, for an aviati section in the army, all the det of which were published in April issue, has passed the Hou and received favorable action the Senate Military Affairs Co mittee.

APPROPRIATION PASSED.

The army appropriation bill l passed, including $250,000 for ae nautics, of which $50,000 was ma available at once.

Aeronaut Leo Stevens

Leading Balloon Builder of the World

Balloons

to carry One to Fifty Passengers

Leading Sportsmen use a Stevens Outfit

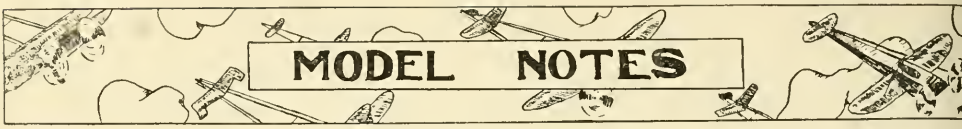
AIRSHIPS, AEROPLANES AND BALLOONS OF EVERY DESCRIPTION

USED BY NINETY-FIVE PER CENT. OF THE CLUBS IN THIS COUNTRY AND CANADA

GAS GENERATORS, PARACHUTES, SAFETY-PACKS

If It's in the Aerial Line, Let Me Estimate

Box 181, Mad. Sq., New York



HARRY SCHULTZ, Model Editor

THE DEAN DISTANCE FLYER.

The model shown in the accompanying drawing was constructed by Mr. William P. Dean, one of England's most famous model flyers. Although this model was constructed in 1911, it is remarkably up to date in every detail and would be able to hold its own in any contest of to-day.

The fuselage is triangular in shape and is constructed of 1/4" square whitewood. It is braced by a brace of bamboo 1/4" in thickness, cut to streamline form, and is placed 3" from the rear end of the fuselage. At the center of the fuselage is a piano-wire brace and also two upright wire braces, which take stay wires extending from the front to the rear of the fuselage.

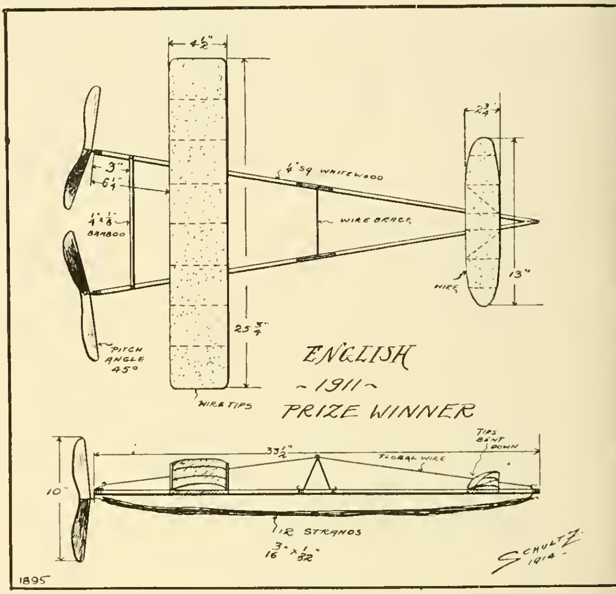
The main plane is built up of split bamboo and has a span of 25¾", with a chord of 4½" and a camber of ⅜". It is covered on the top with proofed silk. The elevator is co ucted of piano wire, with the ti ent down for elevation. It is ered on the top side with proofe silk. No elevation block is use, the bent-down tips giving the necessary elevation.

The propellers are 10" in diameter, with a pitch angle of 45 degrees, and are bent from 1-16" birch by steaming and twisting.

The bearing consists of "L" brackets of brass, with the ordinary clock washer on the propeller shafts.

Each motor consists of 12 strands of 3-16 x 1-32" rubber, and are suspended below the frame.

The model has flown over 1,000 feet with 500 turns of the propellers.



MODEL NOTES.

Paterson, N. J., is responsible for the following:

A crowd of people watching the flight of a model aeroplane in a field to the rear of the J. & A. Barbour Linen Thread Co., on Crooks avenue, were surprised yesterday afternoon to see a diminutive blackbird rise from a thicket, attack the model and dart away again. While the model continued to circle 100 feet above the thicket, the bird repeatedly darted out and continued the attack, until the machine glided gracefully to earth.

The model was being tried out by J. Raymond Stone, of 533 Union avenue, who has had considerable success in model building and has taken a number of prizes in competitions at Van Cortlandt Park, New York City. The model was less than three feet in length, but was capable of a flight of a quarter of a mile.

Evidently the blackbird was deceived by the hovering flight of the model, and attacked it as a hawk. When the model came to earth, 60 seconds after being launched, the parchment covering of the planes was pierced in several places by the beak of the bird. A fledgling was discovered in a nest in the thicket from which the mother bird had flown.

LE RHONE MOTORS IN THIS COUNTRY.

The Sloane Aeroplane Co. has taken over the agency for the Le Rhone motor, in addition to the Gnome and Anzani, for which it has been agents for over two years.

The following information concerning the record-breaking 60-h.p. Le Rhone engine, given out by the Sloane Aeroplane Co., should prove of interest to readers, especially when the fact is borne in mind that this motor, although of only 60 h.p., was able to carry a load of gasoline necessary for a 16-hour flight:

The 60-h.p. Le Rhone motor is of the 7-cylinder rotary type, having a bore of 105 m.m. and a stroke of 140 m.m., and total weight, including fittings, of 193 lbs. The cylinders are mounted staggered on the crank case. They are machined from solid billets of steel, which weigh in the rough 65 lbs. and when finished only 8 lbs. The cages for the intake and exhaust valves are integral with the heads of the cylinders. Being placed in this exposed position, they are kept perfectly cool and there is no over-heating troubles whatsoever, since the motor revolves at about 1,200 revolutions. The valves are operated by a push rod, which actuates a rocker-arm on the top of the cylinder and opens and closes both the intake and exhaust valves. Probably the feature which has contributed most toward the phenomenal success of Le Rhone motors during the past year or so, is that which makes it possible for even the little 60-h.p. type to fly a machine for 16 hours continuously, is the small quantity of gasoline and lubricating oil they consume. In fact, the gasoline consumption of Le Rhone motors, o ing to the efficient valve action, cut down to about one-third of wl is used on other rotary moto while the old consumption, than to the special forced-feed oiling s tem, is nearly one-half of what used on similar types of engines.

From a military standpoint, Rhone motors present the adva ages of using the same size a types of cylinders, valves, pisto and cylinder parts in all mode Thus one kind of spare parts su fices, when on the field or in acti in wartime, to make repairs either the 60, 80, 120 or 160-h. types. The result of this is th the French army this year is spe fying more and more Le Rhone m tors on her military machines, a nearly one-half of the leading ae plane concerns abroad are equip ing their machines with these moto

In addition to the Le Rhone m tor, the Sloane Aeroplane Co. h the agency for the new monoval type of Gnome engines, which France share the honor with the Rhone motor of accomplishing great percentage of the world's avi tion records. Complete details this motor are given in the ne motor catalog just issued by t Sloane Aeroplane Co.

MARCH EXPORTS $90,27

Imports for March, 1914, par only, $7; for nine months endi March, parts only, $26,240.

Exports for March: Aeroplan and parts, 9, valued at $90,270; f nine months ending March, aer planes and parts totaled $180,85

No exports of foreign make du ing March. No foreign goods warehouse.

AERONAUTICS
Combined with "FLY"

iblished semi-monthly in the best interests of Aero-utics
BY
AERONAUTICS PRESS INC.
250 West 54th Street
New York
Telephone, Columbus 8721
Cable, Aeronautics, New York

RNEST L. JONES Editor
. B. SELLERS, Technical Editor
ARRY SCHULTZ, Model Editor
A. BEIER, Advertising

itered as Second Class Mail Matter, September 22, 08, under the Act of March 3, 1879. $3.00 a year, cents a Copy.

ostage free in the United States, Hawaii, the Philip-nes and Porto Rico. 25 Cents extra for Canada d Mexico. 50 Cents extra for all other countries.

ie magazine is issued on the 15th and 30th of each onth. All copy must be received 6 days before te of publication. If proof is to be shown, allow-ice must be made for receipt and return.

ake all checks and money orders free of exchange d payable to AERONAUTICS PRESS.

ibscribers will kindly notify this office if discon-iuance is desired at the end of their subscription riod, otherwise it will be assumed that their sub-ription is to be continued.

VOL. XIV. No. 11 JUNE 15, 1914 15 Cents

AERONAUTICS

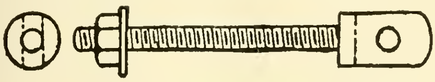
WITH WHICH IS COMBINED **FLY**

Official Organ and Bulletin—Aero Club of Pennsylvania
The Aeronautical Society


The International Hydro-Aeroplane Race
held at Monte Carlo in April was the usual
Bosch Victory
of course
C. H. Pixton piloting a Sopwith hydro-aeroplane powered with a Bosch-Equipt Gnome motor covered the 150 knot course in two hours and thirteen seconds.
Every record is a Bosch Record, too.
Be Satisfied Specify Bosch
Correspondence Invited
Bosch Magneto Company
201 West 46th Street : New York

TESTS ON EYE-BOLTS

The following table was compiled from tests carried out at East London College (University of London) on eye-bolts used in aeroplane construction, by W. G. Mann, BSC., and J. Brimelow, BSC., and presented to the Research Committee of the Aeronautical Society of Great Britain. The bolts were of the shape shown in the figure and were tested by inserting as large a pin as possible through the eye. All the fractures occurred at the bottom of



FORM OF EYEBOLT TESTED

the thread. The eyes were not distorted except in case of the largest.

TABLE OF RESULTS.

Length of bolt in inches.	Diameter in inches.	Breaking load, lbs.
4*	.365	——
4	.245	2,750
4	.245	2,720
3	.242	2,675
3	.242	2,600
2½	.246	2,875
2½	.246	3,025
2	.17	1,075
2	.17	1,575

*There were two specimens this size. When as large a wire as possible was through the hole it sheared. The hole was enlarged slightly—to ¼-inch diameter—and a ¼-inch rod used. Again the latter sheared, but the hole was noticed to have elongated.

AERIAL PROPELLER EXPERIMENTS*

AT THE AEROTECHNIC INSTITUTE OF THE UNIVERSITY OF PARIS

By M. B. SELLERS

I give here some results obtained in tests of aerial propellers, made by means of the "chariot dynamometrique." These experiments were made by Ch. Maurin and A. Toussaint, and are described in Part III of the Bulletin of the Institute Aerotechnique of the University of Paris.

The propellers were mounted on a car fitted with an electric motor for rotating the propellers, and with instruments for recording the thrust, torque, propeller rotations and speed of car. The car was run on a straight track and driven by the propeller thrust. For a detailed description of the apparatus and method of experiment, I refer to this Bulletin.

Each propeller was first tested standing (i. e., at a fixed point), and the curves representing the thrust and power, as function of the number of turns, constructed. Afterwards, the measurements were made for the propeller while advancing, viz., the speed of advance, number of turns per second, the thrust and the power delivered to the shaft. Then the thrust ratios (i. e., thrust advancing over thrust standing), and power ratios were calculated, all for a *constant speed of rotation*. Also, the efficiency, defined as the power exerted by the propeller over the power delivered to its shaft. Next the curves were plotted for these, taking $\frac{V}{nD}$ for abscissas, where V is speed of advance; n, number of turns, and D diameter of propeller. It was found that the values for the power-ratio $\frac{w}{w_o}$, corresponding to the highest speeds of rotation, were slightly higher than those corresponding to the lowest speeds; while the efficiency values were slightly lower for the highest speeds than for the low speeds. However, these three ratios can, in a first approximation, be considered functions of $\frac{V}{nD}$.

Owing to the conditions of the experiments, the points corresponding to the higher values of $\frac{V}{nD}$ are less accurately determined than for the lower values.

Each propeller is defined by its projection on a plane perpendicular to its axis; and by a certain number of sections. For each is given a table of results at fixed points, and the values a, b, and q of Renard; a may be called the *unit thrust*—that is, the thrust for a propeller of unit diameter, rotating at unit speed, and having the same *pitch ratio* (not pitch). Similarly, b is the unit work in kilogrammeters per second. The quality q does not seem to be of much importance.

The pitch is given for the five sections shown, determined from the slope of the chord and the circumference at the section (the usual method). What I call the *virtual pitch*, viz., the speed of advance at which there is no thrust divided by the number of turns ($\frac{V}{n}$ for $\theta = 0$), is also given. Because of the rounded back of the blades, this value is always higher than the measured pitch.

The curves in the first diagram give the thrust θ_o and power w_o at a fixed point, plotted on the number of turns per minute. The other diagram gives three curves, all plotted on $\frac{V}{nD}$; one for the thrust ratio $\frac{\theta}{\theta_o}$ being the ratio of the thrust under the conditions V and n, to the standing thrust, for the *same number* of turns per second; one for the power ration $\frac{w}{w_o}$, and one for the efficiency, $\rho = \frac{\theta V}{75\,w}$.

The results of eight propeller tests are given in the Bulletin, but I shall give four here and later comment on the others.

It is a pity that a set of propellers, varying in only one characteristic, was not made and tested; for instance, having the same diameter, pitch, etc., but varying in profile. The propellers tested vary in diameter, pitch, form and profile, and no conclusions can be drawn with certainty.

The meaning of the letters used is as follows:

V = Speed of advance in meters per second.
N = Number of turns per minute.
n = Number of turns per second.
D = Diameter of propeller in inches.
V_o = Work delivered to shaft in kilogrammeters p. s. standing.
θ_o = Thrust standing.
θ = Thrust advancing.
w_o = Work in h.p. delivered to shaft, standing.
w = Work in h.p. delivered to shaft, advancing.
ρ = Efficiency.

* Charts or Propeller No. 11, Torque Table and Chart will be printed in the next issue.

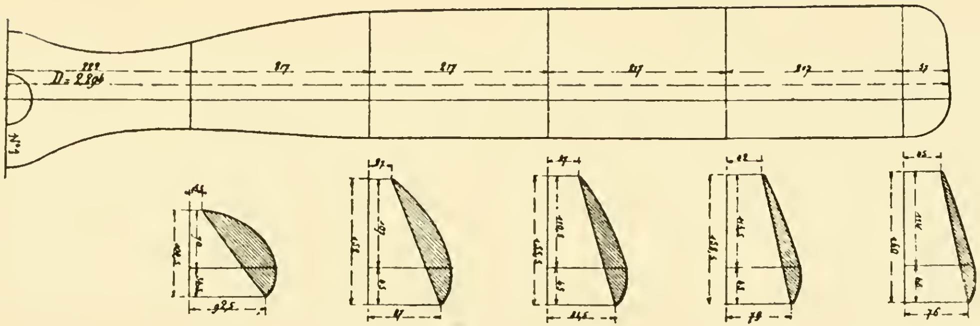


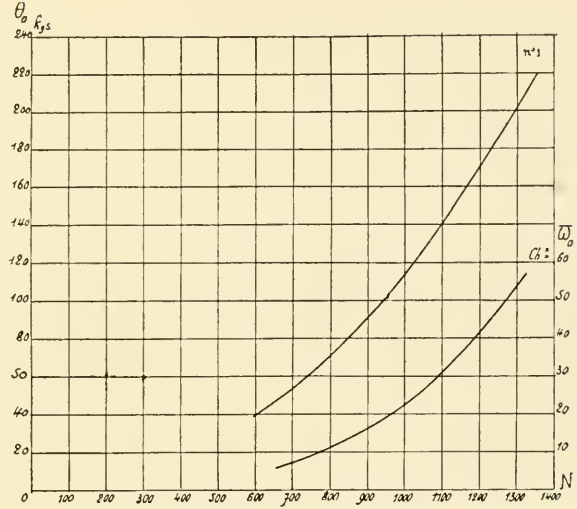
Table of Results at Fixed Point

N	n	Θ_0 en kgs	ϖ_0 en chevaux	P_0 en kgms par seconde	$\alpha = \frac{\Theta_0}{n^2D^4}$	$\beta = \frac{P_0}{n^3D^5}$	$\frac{\Theta_0}{\varpi_0}$	$\frac{\alpha}{\beta}$
600	10	39,6	»	»	0,0143	»	»	»
660	11	48,2	6,1	457	144	0,00541	7,90	2,65
720	12	57,1	8,05	604	144	551	7,10	2,60
780	13	67,4	10,4	780	144	570	6,49	2,53
840	14	78,2	13,2	992	144	570	5,93	2,53
900	15	90,4	16,3	1.221	145	570	5,55	2,54
960	16	103,7	19,8	1.486	146	573	5,23	2,54
1 020	17	118,6	24	1.800	148	576	4,95	2,56
1.080	18	135,3	29	2.175	151	587	4,56	2,57
1.140	19	152,5	35	2.625	152	603	4,36	2,52
1.200	20	170	42,1	3.150	153	621	4,04	2,46
1.260	21	188	48,4	3.630	154	617	3,89	2,50
1.320	22	207	56	4.200	154	620	3,70	2,49

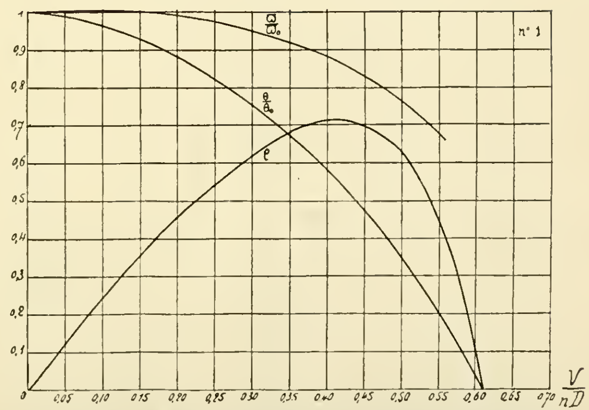
$$q = \frac{\alpha^3}{\beta^2}\,\frac{4}{\pi\,.\,0{,}08} = \frac{\overline{0{,}0150}^3}{\overline{0{,}0058}^2}\cdot\frac{4}{\pi\,.\,0{,}08} = 1{,}60.$$

PITCH FOR THE FIVE SECTIONS: $1^m,03 - 1^m,09 - 1^m,18 - 1^m,28 - 1^m,32$.

Value of $\frac{V}{n}$ for $\Theta = 0$, $1^m,40$.



Thrust and Power at Fixed Point



Thrust, Power and Efficiency while Advancing

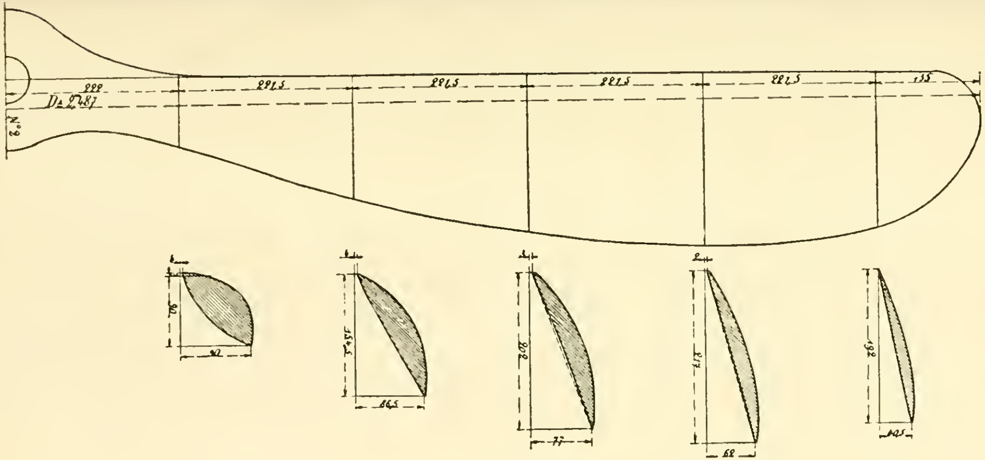


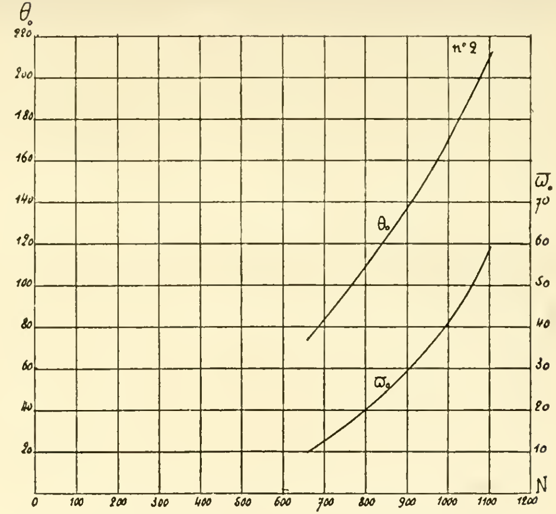
Table of Results at Fixed Point

N	n	Θ_0 en kgs	ϖ_0 en chevaux	P_0 en kgms par seconde	$\alpha = \frac{\Theta_0}{n^2D^4}$	$\beta = \frac{P_0}{n^3D^5}$	$\frac{\Theta_0}{\varpi_0}$	$\frac{\alpha}{\beta}$
660	11	74	10,5	787	0,0158	0,00622	7,04	2,54
720	12	88,4	14,1	1.058	160	642	6,26	2,49
780	13	104	18,75	1.404	161	670	5,54	2,40
840	14	120	24	1.800	160	690	5	2,32
900	15	136	29,4	2.200	160	684	4,62	2,34
960	16	156,5	35,6	2.670	160	685	4,39	2,34
1.020	17	179	43,7	3.280	162	700	4,09	2,30
1.080	18	202,3	54,7	4.100	163	736	3,69	2,22
1.100	18,33	210	58	4.350	163	745	3,60	2,20

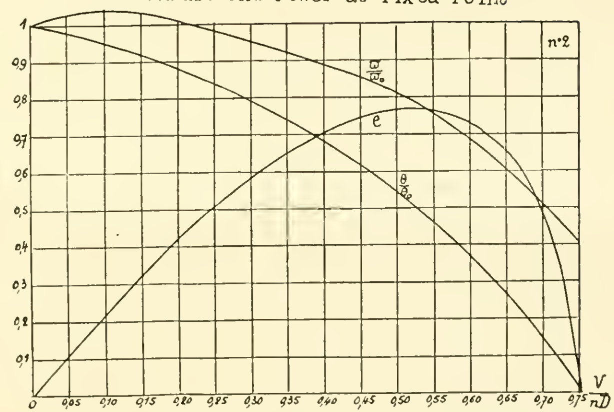
$$q = \frac{\alpha^3}{\beta^2} \frac{4}{\pi \cdot 0{,}08} = \frac{\overline{0{,}0162}^3}{0{,}007^2} \cdot \frac{4}{\pi \cdot 0{,}08} = 1{,}38.$$

PITCH FOR THE FIVE SECTIONS : $1^m,29$ — $1^m,48$ — $1^m,535$ — $1^m,534$ — $1^m,465$.

Value of $\frac{V}{n}$ for $\Theta = 0$, $1^m,88$.

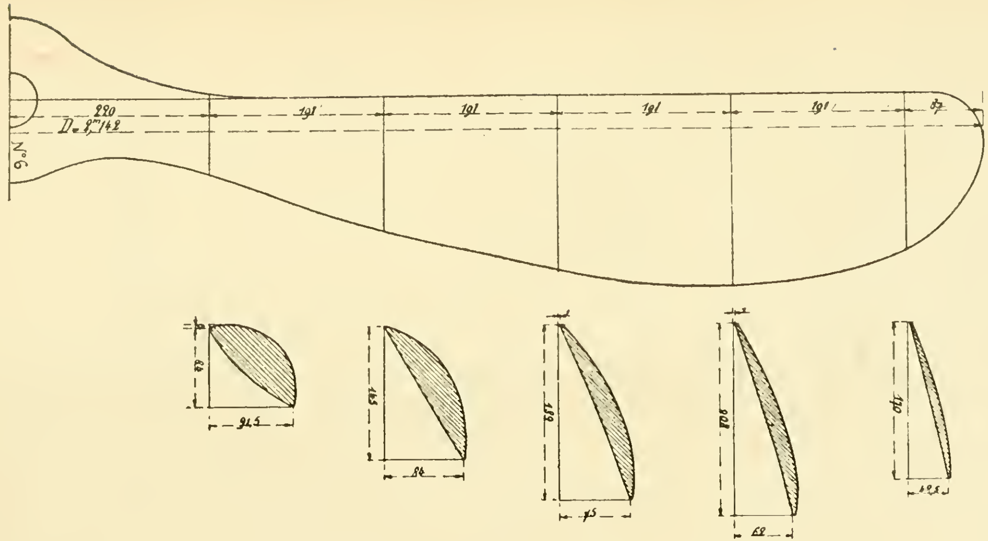


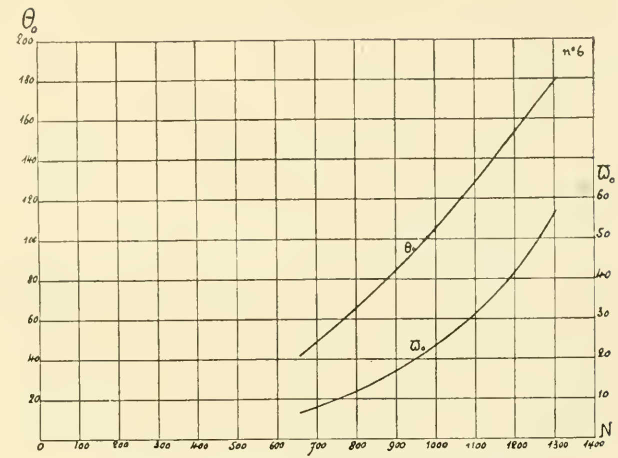
Thrust and Power at Fixed Point



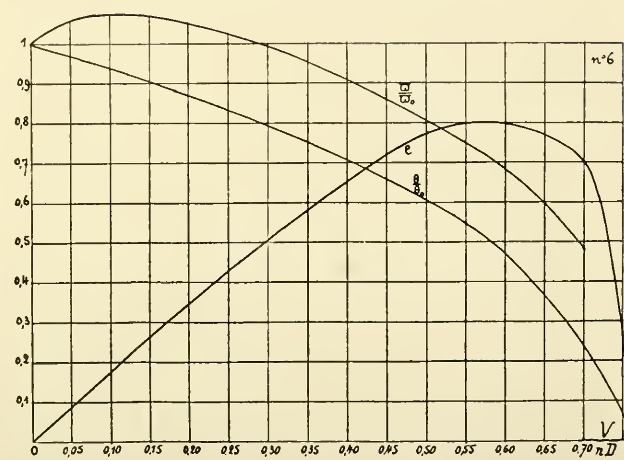
Thrust, Power and Efficiency while Advancing

PROPELLER No. 2. D = 2.487 m.





Thrust and Power at Fixed Point



Thrust, Power and Efficiency while Advancing

Table of Results at Fixed Point

N	n	Θ_0 en kgs	ϖ_0 en chevaux	P_0 en kgms par seconde	$\alpha = \frac{\Theta_0}{n^2 D^4}$	$\beta = \frac{P_1}{n^3 D^5}$	$\frac{\Theta_0}{\sigma_0}$	$\frac{\alpha}{\beta}$
660	11	42	6,8	510	0,0165	0,00850	6,18	1,94
720	12	52	9	676	171	868	5,78	1,97
780	13	62	11,3	848	174	856	5,49	2,03
840	14	72,5	13,8	1.035	176	837	5,26	2,10
900	15	84	17	1.276	178	840	4,95	2,12
960	16	95,5	20,75	1.560	178	844	4,60	2,11
1.020	17	109	25	1.870	180	843	4,37	2,13
1.080	18	124	29,5	2.210	182	843	4,27	2,15
1.140	19	138	34,8	2.610	182	843	3,97	2,15
1.200	20	152,5	41,8	3.146	182	870	3,65	2,10
1.260	21	167,5	50,5	3.790	181	908	3,31	2
1.300	21,66	178	56,5	4.240	181	924	3,15	1,96

$$q = \frac{\alpha^3}{\beta^2}\,\frac{4}{\pi \cdot 0{,}08} = \frac{\overline{0{,}0181}^3}{\overline{0{,}0085}^2} \cdot \frac{4}{\pi \cdot 0{,}08} = 1{,}31.$$

PITCH FOR THE FIVE SECTIONS : 1m,434 — 1m,495 — 1m,48 — 1m,46 — 1m,545.

Value of $\frac{V}{n}$ for $\Theta = 0$: 1m,61.

AERONAUTICS

Combined with "FLY"

Published semi-monthly in the best interests of Aeronautics

BY

AERONAUTICS PRESS INC.
250 West 54th Street
New York
Telephone, Columbus 8721
Cable, Aeronautics, New York

ERNEST L. JONES, Editor
M. B. SELLERS, Technical Editor
HARRY SCHULTZ, Model Editor
C. A. BEIER, Advertising

Entered as Second Class Mail Matter, September 22, 1908, under the Act of March 3, 1879. $3.00 a year, 15 cents a Copy.

Postage free in the United States, Hawaii, the Philippines and Porto Rico. 25 Cents extra for Canada and Mexico. 50 Cents extra for all other countries.

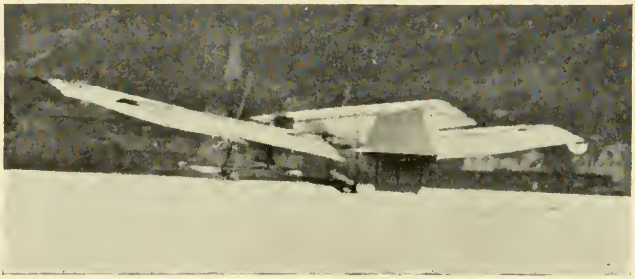
The magazine is issued on the 15th and 30th of each month. All copy must be received 6 days before date of publication. If proof is to be shown, allowance must be made for receipt and return.

Make all checks and money orders free of exchange and payable to AERONAUTICS PRESS.

Subscribers will kindly notify this office if discontinuance is desired at the end of their subscription period, otherwise it will be assumed that their subscription is to be continued.

DID LANGLEY FLY?

The report in AERONAUTICS of last issue stating flight had been made with the original Langley machine has been questioned. The only proof to offer is the picture printed herewith, taken at some distance away, and the machine is stated by an eye-witness to be four or five feet above the water. Thus far the machine has made "four short getaways."



The machine was weighed by Dr. Zahm just before one of the trials, and found to tip the scale at 1,170 lbs., while the original machine weighed 850 lbs. The difference is due to the pontoons and to the fact that the wings are quite a bit heavier than the orignal ones, owing to cross ribs being made of laminated wood instead of hollow-box type. The original cross ribs weighed only one ounce per foot, while laminated ones weigh about 16 times as much. The moter is stated to have run 200 r.p.m. slower than in the original trials on the Potomac. Charles M. Manly, who designed and built the engine, has been at Hammondsport and has made some adjustments which he believes will result in getting the full power.

TRANSATLANTIC ENGINES RUN THIRTY HOURS.

HAMMONDSPORT, N. Y., June 10.—So far as the motors are concerned the Trans-Atlantic flight is as good as accomplished. At one o'clock this afternoon the two Curtiss engines to be used in the Rodman Wanamaker Trans-Atlantic flier completed a test run of thirty hours, having fulfilled every requirement in speed, power, durability and fuel consumption.

So far as was possible the expected flying conditions during the Trans-Atlantic flight were duplicated in every particular. The motors were started at seven o'clock Tuesday morning, mounted side by side, swinging duplicate propellers at the speed estimated as being required for raising the heavily loaded machine at the start of the big flight. For four hours the motors ran at an even speed of 1,250 revolutions per minute. Estimating that after four hours enough fuel will have been consumed to permit a slower flying speed, the motors were then set back to 1,200 revolutions per minute. At intervals of approximately four hours the speed was reduced during the day to a minimum of 1,000 revolutions per minute, which was the slowest speed at which they were operated, though it is estimated the Wanamaker-Curtiss machine will fly with the propellers turning at 900 revolutions per minute.

A record of the performance of the engines was made every fifteen minutes, and during the entire thirty hours their respective speeds seldom varied more than five revolutions per minute. Temperature, water evaporation, oil and gasoline consumption were carefully checked every fifteen minutes day and night. At the end of the thirty hours' run both engines were again speeded up to the maximum of 1,250 r. p. m., at which they started the long run. In the test room men kept constant watch during the entire run, in a roar that in a few minutes proved deafening to casual visitors, but which seemed not to affect those on the job.

The total consumption of gasoline during the thirty hours of continuous running was 288½ gallons; the consumption of oil was 10⅝ gallons. As Lieut. Porte expects to be in the air not more than twenty hours, he has at least a large margin of safety in carrying this weight of fuel and oil, though the big Wanamaker-Curtiss machine is designed to carry a load considerably in excess of that indicated by the test as being necessary.

This pair of Curtiss O-X motors are similar to those used in the navy's hydroaeroplanes at Vera Cruz, the one used last summer by Verplanck and Havens in the 1,000-mile flight from Chicago to Detroit, and that used by Lieut. Carberry, U. S. A., in winning the Mackay military trophy at San Diego. Others of the same type are used in the aviation corps of six foreign navies.

After a thorough overhauling these will be installed in the Rodman-Wanamaker flier, which is rapidly being made ready for its trial flights over Lake Keuka. Among those present during parts of the thirty-hour test were Commander William Macdougal, U. S. N.; Dr. A. F. Zahn of the Smithsonian Institution; Lieut. Porte, R. N.; representatives of the press and many casual visitors.

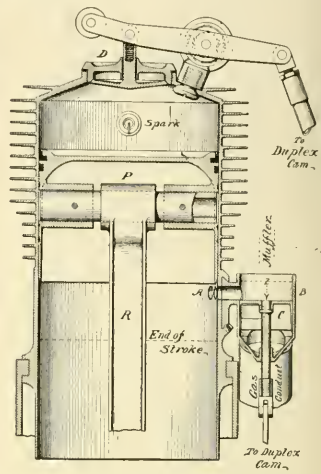
NEW GYRO MOTOR.

The Gyro Motor Co. is now marketing a slide valve intake motor of 80 h.p., weighing, with pumps, fuel inspirators, magneto and tachometer, 225 lbs.

The inside of the motor is bare of all accessories save the pistons P, the connecting rods R and the crankshaft. In this respect it resembles the ordinary reciprocating motor.

The main exhaust valve D remains on the top of the cylinder and is operated by rod and cam. This cam is now in "duplex" form, one side operating the main exhaust, the other the slide intake mechanism B, C; the latter is attached to the outside of the cylinder about 2 inches above the end of the power stroke and is readily detachable.

At this point there are provided the usual Gyro auxiliary ports A, through which the main pressure of the nearly spent stroke exhausts itself, thereby reducing the pressure necessary for opening the main exhaust valve.



Outside of these ports is a cage B in which a small hollow slide C moves with a stroke of about half-inch, y to z; this stroke depends upon the shape of another cam, forming a twin to the main exhaust cam.

The operation is as follows:

When the power stroke reaches the auxiliary ports A the gases escape and relieve the pressure in the cylinder. The piston continues 2 inches to the end of the stroke and then returns for scavenging the burnt gases out through the main exhaust D; the piston then moves down for the intake.

The exhaust D remains open until just before the piston on its intake stroke reaches the auxiliary ports A. In the meantime the small intake slide C has moved outwards to z and the auxiliary port A is now connected through the cage B to a gas conduit filled with fresh mixture. The main exhaust has closed and the piston moves 2 inches further and sucks the gases into the cylinder. The intake slide C then returns to its original position while the piston moves outwards in the compression stroke.

This new Gyro retains the prominent features of its predecessors, the cam which can be set for any degree of compression for throttling and changing power, and the oil shield which deflects the oil to where it is needed and largely prevents deposits on valves.

A popular magazine figures the death roll in six years as 446, including a few who are still alive. Another magazine says that in 12 years of climbing the Central Alps 1,220 people have lost their lives at this gentle art. And yet they say aviation is hazardous.

From LA CONQUÊTE DE L'AIR
Brussels, Belgium

Five or six months ago MM. Breguet, of Paris, acquired a license for France of a system invented by an American, Mr. Means, and they have not delayed in applying it to their biplanes. Underneath one finds a reservoir of lamp black of a capacity of 20 litres. There is also a reservoir of compressed air which is kept filled by a small air pump. A tube connects the two tanks. In this tube is a valve which is operated by the observer. A pull of one second makes a dot—a pull of three seconds makes a dash. Thus is the Morse code revealed against the sky.

From L'ILLUSTRATION, Paris

An American engineer, Mr. Means, has invented for the service of military scouting on board aeroplanes a system of optical telegraphy of remarkable simplicity. The signals Morse are shown against the sky with lamp black.

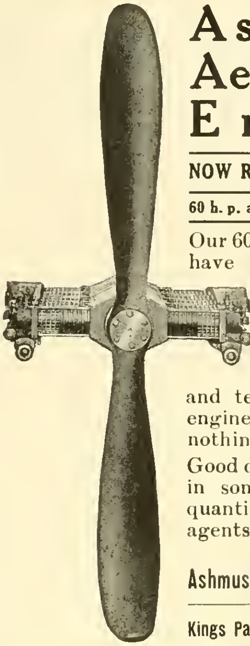
FOR LICENSE APPLY TO

JAMES MEANS
196 Beacon Street, Boston, Mass., U.S.A.

Ashmusen Aeronautical Engines

NOW READY FOR THE MARKET

60 h. p. and 90 h. p., other sizes to order



Our 60 h.p. 8 cylinder engines have flown Wright's Twin-screw, Curtiss-type and Tractor Biplanes, and Bleriot-type Monoplane.

6 yrs. experimenting and testing on Aeronautical engines alone. We make nothing else.

Good discounts to first buyers in some localities, and on quantity contracts, and to agents.

Agencies Open

Ashmusen Manufacturing Company
INC.
Kings Park, Long Island - New York

OPEN FOR ENGAGEMENT **"TONY" JANNUS**

WILL FLY WATER DATES ANYWHERE

Passenger carrying, night flying and fire works from the flying boat specialties. Pioneer Flying Boat Pilot of the World. Following Records: Long Distance, 1973 miles, Omaha-New Orleans; Continuous Flight with passenger, 251 miles, Paducah-St. Louis.
280 Engagements. 280 Successful Contracts Filled.

1419 Columbus Avenue, Sandusky, O.

This page contracted for by

A. LEO STEVENS

FOR NEXT ISSUE

BOOKS

ALL AERO BOOKS
FOR SALE BY
AERONAUTICS
250 W. 54 St., New York

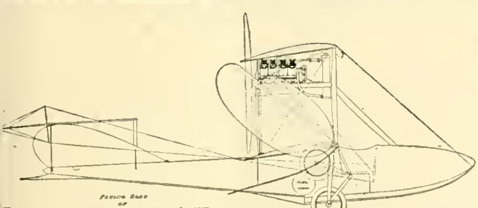
MAGNETOS

All Makes Repaired, Sold and Exchanged

Mail orders given special attention

Hecht's Magneto Exchange
230 West 49th Street - New York

Member of The Aeronautical Society



Boland Flying Boat

ONLY TWO CONTROLS
SIMPLEST TO OPERATE

BOLAND MOTORS—60, 70, 100-125 H.P.

Repair and Construction Work in Best Equipped Factory

AEROMARINE PLANE & MOTOR CO.

Exclusive manufacturers under Boland Patents AVONDALE, N. J.

THE NEW WRIGHT AEROBOAT TYPE "G"

By GROVER CLEVELAND LOENING

The new Wright "Aeroboat," like practically all the Wright aeroplanes, is driven by two propellers, a feature which is claimed to be even more advantageous on a craft of this type than on a land machine. Complete protection of the lateral propellers has been obtained by so mounting them that their tips are above the rear of the lower surface.

The propellers in this machine, however, are turned in a direction opposite to that customary in the older types of Wright aeroplanes, a feature which has greatly added to the practical elimination of disturbing effects in stability due to high thrust. By using two propellers instead of one, there is no tendency for the machine to keep turning one way, due to the torque, which makes flying much easier and more comfortable.

In addition to this, there is present in all single-propeller machines a gyroscopic effect, which tends to make the machine dive when suddenly turned to one side and tends to make it stall when suddenly turned to the other. Among novices, this characteristic has doubtless caused many accidents in stalling, particularly on tractor machines driven by a rotary motor, which tend to stall when turned to the right.

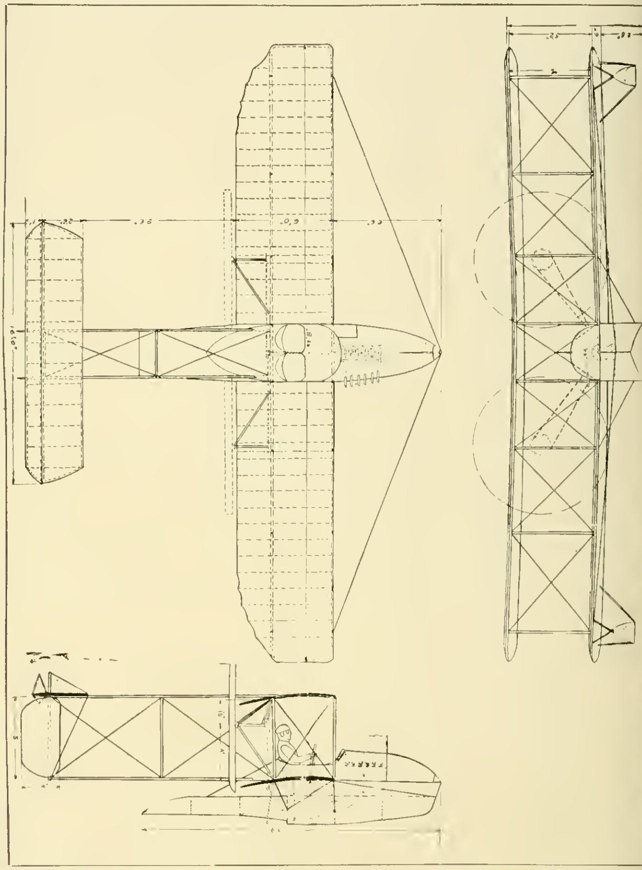
The Wright Aeroboat type "G" belongs to the class of three-pontoon marine aeroplanes, the center pontoon or hull furnishing most of the flotation. No special hydroplane paddles, however, are attached to the auxiliary end pontoons, as their use has been found unnecessary.

Even more so than in former practice, the center hull is exceedingly boat-like in appearance, and is virtually a water-tight pontoon, the motor, seats and other parts being placed entirely above the deck which seals the top of the pontoon. At the same time the sides of the hull are carried above this water-tight deck to the height of the wings, and form an enclosed body for the motor and seats, protecting them very effectively from spray and waves.

The motor is situated in the front, motor-car fashion, and the seats, side by side, are back of the motor and situated at the center of the wings. At the rear of the main wings are the two propellers, and beyond these the rudders, which are carried on a tail frame from the center section.

Under the seats and above the step of the hydroplane pontoon are large air tubes, which pass from the deck through the bottom of the hull. These tubes serve not only to ventilate the step, but drain the cockpit, in which the seats are located, of any water shipped in bad weather.

The hull is constructed of ash and spruce framing of enormous strength, with some of the keels as great as 4 sq. in. in cross section, the entire framing being covered with a thick metal sheeting, carefully treated for preservation against the deteriorating action of salt water. The neat dashboard back of the engine, the comfortable rubber matting floor, and the leather upholstered seats are similar in ap-



pearance to that of high-class motor cars.

The stream line hoods over the engine and around the seats are built stronger than usual, of a combination of metal and double planking of wood covered with canvas.

Directly in front of the engine is a large space, which is used for the storage of anchor and anchor ro[pe] and other marine equipment, a[nd] back of the seats is a convenie[nt] place for tools, etc. Engine, tran[s]mission, planes, boat, seats and co[n]trols are all very accessible.

In tests of the Navy aeroboa[t] made at Toledo recently, the pa[s]senger carried was able quite easi[ly] to open up the engine hatches, e[x]amine the engine and make min[or] adjustments while in flight. It wou[ld] even be possible to replace spar[k] plugs while the machine is in oper[a]tion in the air.

The boat hull itself is 19 ft. lon[g] and at its widest has a beam of 4 in. The height of the hull is suc[h] as to give clearance to the tips [of] the wings of 3½ ft. above the wat[er] surface when hydroplaning, whic[h] gives splendid rough-sea qualiti[es] and makes the possibility of catc[h]in a wing in rough water qui[te] remote. Over the engine the met[al] covering is made in the form [of] two large hatches, which slide i[n] and out. When removed, the[se] hatches give access to the engi[ne] for one or two persons, and whe[n] closed serve as a practical wate[r]tight covering.

The wings are 38 ft. span, 6 f[t.] chord, with a gap of 5 ft. The mai[n] carrying surface is 430 sq. ft. T[he] interior construction of the win[gs] themselves, like most other detai[ls] in the machine, have been improve[d] over previous practice. The ribs a[re]

nade solid of I-beam shape, and he spars are increased in depth, he thickness of the wing being nuch greater than has previously een employed. The wings are covered with a special grade of linen, reated with a water-proof preparation developed by the Wright Company. The struts, stream line form, re of ample cross section, and the mportant sustaining wires throughut the craft are doubled, there having been introduced an entire dulicate system for the main warping vires as well.

A new type of joint has been dopted for connecting the wires o the struts and planes. These oints consist simply of a hookhaped plate of great strength, into which the eye of the wire fits. This as permitted of the entire elimination of the bolts and pins ordinarily mployed.

The finest special steel wire is sed throughout, and turn-buckles nd other joints apt to become oosened have been almost entirely liminated. As an engineering structure, the wing cell of type "G" is unit of remarkable strength and ightness, and throughout there has een employed a much larger safety actor than usual.

The wings are not divided at the enter, as is customary, the spars at he boat being continuous from one ving to the other.

The control of the wings and rudders in the new type is duplicate, nd provision has been made for nounting either the customary Vright lever control or the new Vright wheel control (described in AERONAUTICS for March 15).

The rudders of the Wright aeroboat are novel in form and powerful in size (22 sq. ft.). The vertical twin rudders are pivoted on two steel tubes, which form the rear strut of the tail frame supporting the rudders and work in unison.

The elevator, of the new Wright inherent stability type, is carried very high, being attached to the top of the rectangular tail frame above the two rudders. This feature has greatly added to the natural tendency in the balance of the machine to overcome the high thrust of the propellers. The elevator in type "G" is 16 ft. span and has a total area of 53 sq. ft. The construction of both the elevator and the rudders is similar to that of the wings, and ample bracing has been provided to avoid vibration.

The transmission on the new Wright aeroboat has introduced many refined engineering problems, in which the experience of the Wrights for so many years in this kind of work has resulted in a remarkably successful drive. The propellers are 8 ft. 6 in. in diameter and rotate approximately at 580 r.p.m. They are driven by chains from the central drive shaft, one of the chains being crossed. The shafts are so distanced by guides and radius rods as to permit of easy alignment.

The central drive shaft, passing under the seat, drives the propellers from the engine situated in front. At the front end there is mounted the new Wright shock-absorbing drive, a feature new to aviation, which is an application of the highest engineering principles and is a step in the progress of aeroplane construction that has considerable significance. This shaft carries at its end a steel cone, upon which are mounted pins. On the flywheel of the engine similar pins are mounted, and connection between these and the pins on the shaft is made by eight shock absorbers. The shaft cone is free to rotate in relation to the flywheel, but the two are restrained by the shock absorbers, these being the only direct connection between the engine and the transmission. As a consequence, the power of the engine is entirely transmitted to the rest of the machine by these shock absorbers. The introduction of this elastic element has not only enabled the weight necessary in the transmission to resist the severe strains of the engine to be greatly reduced, but has greatly lengthened its life.

This, however, is equally true with reference to all other steel parts of the aeroplane, which, by the introduction of this shock-absorbing element, are relieved of the constant vibration which tends to crystalize steel parts, thereby greatly increasing the safety factor of the machine.

It may in addition be remarked that by this arrangement there is obtained entire freedom in the placing of the motor and the propellers, and the ideal system of having the motor in front and the propellers in the rear has been rendered exceedingly simple and practical.

The weight of the entire aeroboat empty is 1,300 pounds, a record in construction in machines of this size and strength. The motor is a six-cylinder 60-h.p. Wright.

The speed range of the machine is in the neighborhood of 40 to 60 miles an hour, and splendid climbing ability has been shown. On many occasions three people have been lifted with ease, and the scores of passenger flights that Harry N. Atwood has already made with his aeroboat, as well as his splendid trips from Toledo to Detroit, have proved the worth of the new type.

Mr. Atwood's aeroboat was the second of this type to be delivered, the first one having been constructed for the United States Navy.

WRIGHT LICENSES USERS

The Wright Company makes public, through AERONAUTICS, its first announcement relative to the granting of licenses to users of machines.

The company says to flyers of infringing machines: "If you desire to avail yourself of this opportunity to make your machine usable under authority of the Wright patent, please fill out the accompanying blank, sign the license agreement enclosed, and mail both to The Wright Co., Dayton, O., on or before July 1st next, together with certified check, postoffice or express money order for $1,000," upon the acceptance of which license will be executed and plate sent for attachment to machine.

As stated in the last issue (page 147), this $1,000 fee covers the calendar year only, and there is to be paid $25 for each day that the "machine is operated, used or exhibited for or in prospect of profit, prize or reward." The licensee must keep an accurate record of all exhibitions, flights or contests in which the machine may participate, which shall be at all times open to inspection of The Wright Co., and agrees to render the said sompany each month a sworn statement concerning the number of flights, together with the amounts due. The Wright Co. furnishes a metal plate for attachment. The grantor holds the right to cancel the agreement forthwith in case of violation.

These terms do not apply to Americans importing foreign machines, foreigners bringing in foreign machines or to schools of aviation, for which special agreements will be drawn.

CHANGE OF OWNERSHIP.

Orville Wright is understood to have purchased the stock of The Wright Company from the original owners, under a purchase arrangement made at the time the company was formed. The sale back to Mr. Wright has been confirmed, and the price is stated unofficially to be around 40, at which price the investors doubled their money, besides receiving three yearly dividends totaling some 23 per cent. The directors who have sold their stock are Cornelius Vanderbilt, August Belmont, Andrew Freedman, Morton F. Plant, Russell A. Alger, Edward J. Berwynd, Pliny W. Wiliamson, Henry S. Hooker and Theodore P. Shonts.

This new arrangement leaves Mr. Wright free to conduct the company according to the dictates of his own mind, without having to consider in any way the interests of other stockholders.

WALTER JOHNSON STARTS SCHOOL

Walter E. Johnson, with C. A. Herrmann, has incorporated the Walter E. Johnson School of Aviation, at Livonia, N. Y., with $10,000 capital stock. A school for water flying machines will be conducted at Conesus Lake, where passenger carrying has been done since Decoration Day. All teaching will be done over water, with a hydroplane, dual control, and a flying boat, both Thomas machines. Mr. Johnson is assisted by Mr. Winnerly, one of his last year grads.

Johnson has made a most creditable name for himself in the past years as a consistent and conservative flyer. He made a new American two-man endurance record of 3 hrs. 51 min., on Oct. 31, 1912.

Those entering at the new school will be sure of the best attention.

"TONY" JANNUS LAUNCHES BUSINESS

"Tony" Jannus, whose letterhead reads "Pioneer Flying Boat Pilot of the World," has located himself in business at 1419 Columbus avenue, Sandusky, O., as a specialist in water flying. While not filling water "dates," he will be carrying passengers. Night flying and discharging fireworks from the flying boat are features. He is open for contracts for exhibition flying or ferry and passenger work. The boat will carry three.

Jannus is one of the best in the business, and is universally liked and honored. His greatest feats were his flights from Omaha to New Orleans, some 1,973 miles, and from Paducah to St. Louis, 251 miles, all over water. Jannus has made all his successes with the 2-cycle motor, and is a strong adherent of that type. Those who saw the race around Manhattan last year will remember the flight made by Jannus, and this alone would be sufficient proof of his ability.

BROCK WINS DERBY.

London, June 6.—An American, Walter L. Brock, who recently visited America, his native country, and who spoke at the Aeronautical Society's dinner in March, won the Aerial Derby, an annual race around London, total 94½ miles. He used an 80-h.p. Morane monoplane. His time was 1:18:04.

MERRILL MACHINE HAS NO ELEVATOR.

A. A. Merrill, whose articles in AERONAUTICS on lateral stability have created a considerable discussion, has been experimenting with a tractor biplane with no tail, the flying being done by Roy Waite. It is claimed that the machine will rise or glide at a safe angle simply by speeding or throttling the motor. There is no fived tail or horizontal rudder. The experiments have not as yet included the Merrill lateral stability system with which readers are familiar.

MILITARY FLYING.

During the past two weeks, ending May 30, at the Signal Corps Aviation School, San Diego, there were made 76 flights, totaling 21 hours, 50 minutes, in which 38 passengers were carried.

For the five months ending May 30, 1,112 flights were made, with a total of 300 hours, 51½ minutes, in which 541 passengers were carried.

Both machines ordered by Carranza from the Moisant International Aviators have now been delivered. Final tests have been made at Hammondsport on the military tractor built for the army.

WORLD RACE SCHEDULE.

Announcement has been made by the Panama-Pacific International Exposition of the date for the aviation meet and the start of the around the world race in 1915. May 8 to 18, 1915, has been set aside for thos events. The start of the race itse will be preceded by a week of inte national aviation for prizes totalin $25,000, offered by the Expositioi This amount is entirely separat from the prize of $150,000 offere by the Exposition to the winners (the world race. The first three da) of this meet are to be devoted to th customary aerial sports, and the la: four days are to be devoted to mil tary maneuvers in conjunction wit the United States troops and the ir ternational military forces represen ing the various countries at the E: position; also acting in conjunctio with these will be the vessels fror the fleet of battleships. These even are open to every type of aeri: craft.

Arnold Kruckman, Chief of th Bureau of Aeronautics of the Pai ama-Pacific International Expositioi left San Francisco, May 28th, for h trip around the world over the rou of the race, going to Labrador froi Chicago by the Canadian Rout which is being considered as an a ternative route for the flight, follov ing the St. Lawrence River in pre erence to going by way of Ne York. The change suggested is b ing considered on account of i feasibility and safety.

General Castillo, Cuban Commi sioner to the Exposition, has ai nounced that his country will ente at lease two fliers in the Round th World Race. Captain J. H. Wo den, aviator with the Mexican Fe eral Army, has been proposed by th city of Dallas, Texas, as the pil for the aeroplane "Dallas," whic they desire to have represent th: city in the race. The Chamber c Commerce of Dallas has agreed t back their flier to the extent c $25,000.

STURTEVANT 100.

The new 100-h.p. aeronautical m tor is the only one being manufa tured at the present time by th B. F. Sturtevant Co. It has bee found that there is little market fc the 60-h.p. and 80-h.p. sizes forme ly built, and consequently thes have been discontinued.

The 100 is a 4-cylinder moto 4½-inch bore by 6-inch stroke, d veloping its power at 900 r.p.m. Th weight is 400 lbs., with all access ries, but without water, oil or fuel.

AMERICAN HYDRO-PLANES IN EUROPE

The Ottoman Ministry of Marin has lately taken under consideratio the advisability of purchasing on or more Curtiss hydroplanes or flyin boats. One of these machines, i charge of an American pilot and business manager, has lately mad several private trial flights near Con stantinople with complete success.— U. S. Consular Report.

IN MEMORIAM

Wilbur Wright

Born April 16, 1867—

Died May 30, 1912

I find AERONAUTICS so interestin that I can't lose a number of it, a it contains more within its littl pages than any other magazine o larger size on aviation.—V. M. Z., New Jersey.

29 West 39th Street, New York

OFFICIAL BULLETIN.

At the general meeting of the Aeronautical Society, June 11th, Leo Kronau, director of the Austrian Airship Co., aided by Captain W. Irving Chambers, delivered an absorbing talk on "Progress in Dirigibles Abroad," with lantern slides and motion pictures were also shown of Pegoud "looping the loop" close to the ground, flying upside down and performing other feats which he instituted and made famous. Mr. Kronau is in this country in the interest of the Mannsbarth system of semi-rigid dirigibles.

William Dubilier, R. S. A., A. I. E. E., lectured on "Wireless in Connection with Aeronautics," using lantern slides and demonstrating his new system of wireless with which he has been experimenting in England on the British Army aeroplanes. These papers will be printed in AERONAUTICS. The same evening the annual meeting was held and the following officers were elected for the ensuing year: President, T. R. MacMechen; 1st Vice President, Frederick W. Barker; 2nd Vice President, Wm. J. Hammer; 3rd Vice President, E. D. Anderson; 4th Vice President, C. W. Howell, Jr.; 5th Vice President, Louis R. Adams; Treasurer, Lewis R. Compton; Secretary, Ernest L. Jones.

By vote of the members, the words "of America" were added to the title of the society. Mr. MacMechen took office and conducted the meeting, making a short speech of acceptance, in which he urged the nationalization of the society in its special field.

There will be no lectures during the summer season, but meetings will be held as usual every Thursday evening, to which all members are invited.

Directors' meetings will be held every Thursday throughout the summer.

A new set of data sheets will shortly be ready for distribution to members. At the same time each will receive some 20 or more data sheets compiled by manufacturers of staple products.

GRAVITATION

The heaviest matter, so physicists say,
Is surely predestined to drop,
And so I suggest, if I modestly may:
Don't you want something light at the top?
—Van, N. Y. Tribune.

Is there anything more certain than a tragedy of the aviator who makes a habit of using the aeroplane as a conveyance?—From the N. Y. Sun.

Under the auspices of the Aero Science Club of America, the first inter-city model aeroplane flying contest was held at Rugby Park, Brooklyn, N. Y., on Decoration Day, May 30th.

The first contest was for models launched from the hand, and proved to be a very exciting affair because of the very high winds prevailing and general bad condition of the weather. Later in the day the wind moderated and the flights generally improved.

This contest was the greatest held in the eastern states in some years, and was very attractive. Many of the flyers came from out of town to attend it.

Among those present was Mr. William P. Dean, one of England's greatest model fleyrs, who, however, had the misfortune to break his models in the preliminary tests, which greatly handicapped his flights. Others present were Armour Selley, former world's record holder; Harry Herzog, whose model looped the loop five times in succession, and J. R. Stone of Paterson, N. J., whose models made wonderfully high flights.

The results follow:

Hand Launched Model Contest: Bamberger, 107 seconds; R. Fu 84 3-5 seconds; F. Watkins, 72 s onds; G. Freeland, 67 3-5 secon A. K. Barker, 67 seconds; F. Broc field, 57 2-5 seconds; W. Bamberg 57 seconds; C. V. Obst, 50 secon Wm. P. Dean, 36 1-5 seconds.

Rising from the Ground Conte Fred. Watkins, 75 2-5 seconds; Bamberger, 70 seconds; Ha Schultz, 53 1-5 seconds; A. K. B ker, 51 2-5 seconds; G. A. Ca nagh, 51 seconds; L. Bamberg 43 2-5 seconds; W. P. Dean, 27 s onds.

The judges of the contest w Edward Durant of the Aeronauti Society and E. H. Unkles of Aeronautical Bureau. The pri were offered by Henry Woodhou editor of *Flying*, and Francis Collins, author of "The Boys' Bo of Model Aeroplanes."

Moving pictures were taken of last contest at Rugby Park, Bro lyn, N. Y., by the Universal Fi Company of New York, and they No. 117 in the Animated Weel Series.

Club meetings are held every S urday evening in the rooms of Aeronautical Society, 29 West 3 Street, New York City. Dues, $3 a year, including a year's subsc tion to AERONAUTICS, which is club organ. Branches may be tablished in any city. For full p ticulars address Harry Schultz, S retary, at this address.

This club controls model flyi in America. No records recogni unless certified by the club.

The next contest will be for flyi boats for duration, on Sunday, J 12, 1914. The machines must be of the flying boat type. Pri and place of contest will be nounced in a future bulletin.

I enjoy reading your interestir and instructing paper every mon from beginning to end, and loc forward to its arrival each tin with pleasure. I am very glad see that you do not intend to hav any fake rumors in it, but just t facts, so that all its readers can rel upon it implicitly. I shall alwa be glad to help you in anyway can.

W. B. S., Worcester, Mass.

The New Benoist Flying Boat in Action

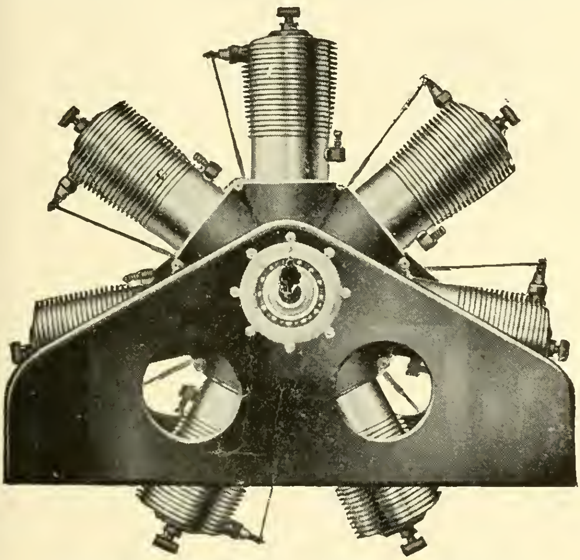
BENOIST
AIRCRAFT COMPANY
St. Louis, Missouri or St. Petersburg, Florida

---

50 H.P.
160 POUNDS

GYRO MOTOR

80 H.P.
207 POUNDS



Endurance Flying Record to Date 4 hrs., 23 min.

Built of Nickel Steel and Vanadium Steel Throughout

Send for Catalog

THE GYRO MOTOR COMPANY, 774 Girard Street, Washington, D. C.

THE NAVY BOATS AT VERA CRUZ
are equipped with

PARAGON PROPELLERS

Send for Photographs of Latest Designs

The three-bladed PARAGONS used by the Navy Aviators give the highest results ever attained. The two-bladed PARAGONS are unequalled. Efficiency, Security, Satisfaction—are back of the name PARAGON—the mark of first-class equipment.

THE AMERICAN PROPELLER CO., 243-249 E. Hamburg St., Baltimore, Md.

[A]ERONAUTICS

TENSILE TESTS ON FLEXIBLE STEEL CABLE AND CABLE ENDS.

The following table is the result of a series f tests carried out at East London College University of London) on various methods f mounting flexible steel cables, in cable ends, y James C. Stewart and L. Reeves, and preented to the Research Committee of the Aeroautical Society of Great Britain.

The specimens were kindly supplied by lessrs. T. W. K. Clarke & Co.

Cables Nos. 1 and 3 were fixed in the folowing manner: The ends were knotted and nned, then inserted in sockets or cable ends. id solder run in. The ends of cables Nos. 2 id 4 were provided with "Turk's heads," as iown in Fig. 2, and were again fixed by runing in solder.

Fig. 1 shows the method of fixing the cables uring the tests. The piece marked "A" was ripped in the jaws of the testing machine.

It will be seen from the table that the method f mounting the cable, as employed for specilens Nos. 2 and 4, gave very satisfactory reilts, the cable in the case of No. 2 apparently ot being weakened by the method of fixing nce it broke outside the sockets.

We do not wish to miss a single issue.
T. J. W., Mass.

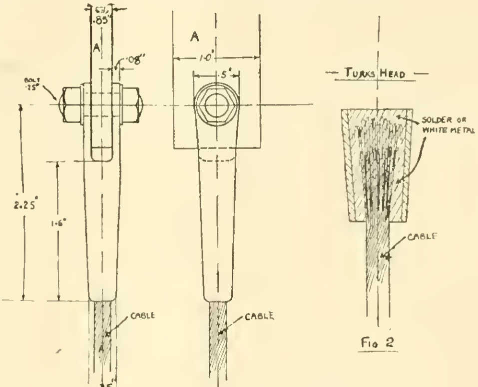


Fig 1 FORMS OF CABLE END TESTED Fig 2

No.	Description of cable.	Diam. of each wire. ins.	Total area. sq. ins.	Breaking load. tons.	Breaking stress. tons per sq. in.	Remarks.
1	6 strands of 19 wires round a core of 19 wires	·0112	·0131	·81	61·85	Broke in socket just below the knot.
2	6 strands of 19 wires round a core of 19 wires	·0112	·0131	1·14	87·0.	Wire went to pieces at this load, two strands remaining unbroken. One socket had started to pull out just before breaking.
3	6 strands of 19 wires round a core of 19 wires.	·0112	·0131	·91	69·47	Broke in socket just below knot.
4	12 wires round a core of 7 wires	·028	·0117	1·24	106·0	Broke in socket where wires were turned over.

AERIAL PROPELLER EXPERIMENTS*

AT THE AEROTECHNIC INSTITUTE OF THE UNIVERSITY OF PARIS

By M. B. SELLERS

REMARKS ON RESULTS

At Fixed Point:—The coefficients and b are seen to vary slightly ith speed of rotation, but may be onsidered constant for the speed i use. The quality q (of Renard) epends on the pitch, and the roduct of the quality by the pitch aries only within narrow limits.

While Advancing:—THRUST—For ll propellers studied the thrust atio $\frac{\theta}{\theta_0}$ diminishes when $\frac{V}{nD}$ increases. As the number of rotaons, n, is constant θ_0 is constant; nd the abscissas are, therefore, roportional to V, the ordinates to θ. l, therefore, decreases as V increases.

POWER:—The curves $\frac{w}{w_0}$, for some f the propellers, show a continual ecrease of power ratio as $\frac{V}{nD}$ increases; while for others there is at irst an increase, followed by a derease. In every case the decrease f power ratio is less rapid than hat of the thrust ratio. As the otation is here constant, the urve $\frac{w}{w_0}$ is also proportional to the orque. The torque is, therefore, ar from being proportional to the hrust.

EFFICIENCY:—The efficiency, ρ, ncreases at first, passes through a naximum more or less extended, nd then decreases to zero for $\theta = O$. The maximum efficiency occurs at a slip of from 25% to 30%. The authors explain how these results can be used in determining the properties of a motor propeller group. This I shall give briefly:

Let V_1 be a given speed of flight. We calculate for different values of n, the values of $\frac{V}{nD}$. We then take on the curve $\frac{w}{w_0}$, the values of $\frac{w}{w_0}$ corresponding to these values of $\frac{V}{nD}$. As we already have the values of w_0, at fixed point, for each value of n we deduce therefrom the values of the power, w, for the speed V_1, and the different values of n. From the values of w in H.P., we deduce the torque in metre-kilograms $T = \frac{75\,w}{2\pi n} = 11.94\,\frac{w}{n}$; and we can thus construct a curve representing T in function of n, for $V = V_1$.

We proceed in the same way for the different speeds, V_2, V_3, etc., and we get the sheef of curves required. The table herewith shows, for propeller No. 11, the results for speeds 5, 10, 15, 20, 25 metres per sec., and the figure 6 gives the curves.

We can then trace, on this graph, Fig. 6, the curve characteristic of our motor, and the points of intersection corresponding to a given speed, V_1, will give the rotational speed n of propeller, under those conditions. From this we can construct a curve giving n in functions of V.

Suppose a motor giving constant torque within the limits of n considered; the motor curve becomes a line parallel to the axis of x's. Now, for illustration, find on the diagram, Fig. 6, the points where the torque 40, 35, etc., cut the curves; and from this draw the curves, Fig. 7, giving the relations between V and n.

Thus, for $T = 30$, we have 17.2 turns per second at fixed point; 16.7 turns for $V = 5$, and 17.0 for $V = 10$, etc. From this we can calculate the values of $\frac{V}{nD}$, and then, by means of the curve $\frac{\theta}{\theta_0}$, the thrust.

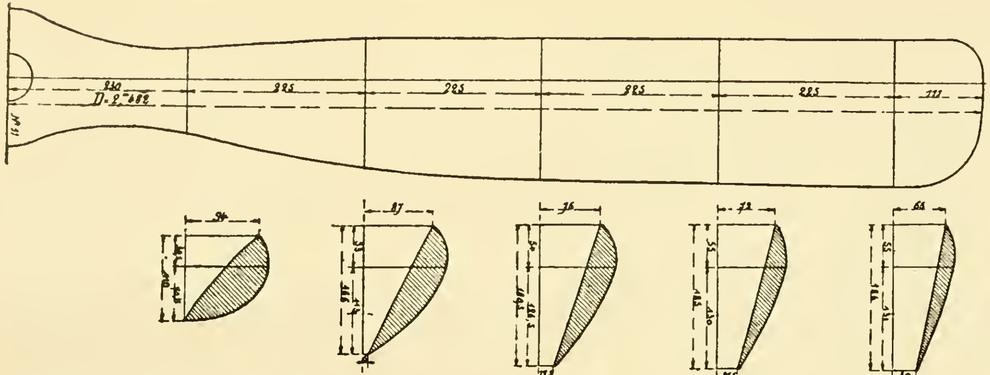
It is seen that, for some propellers, n increases throughout as V increases, whereas for others n at first decreases.

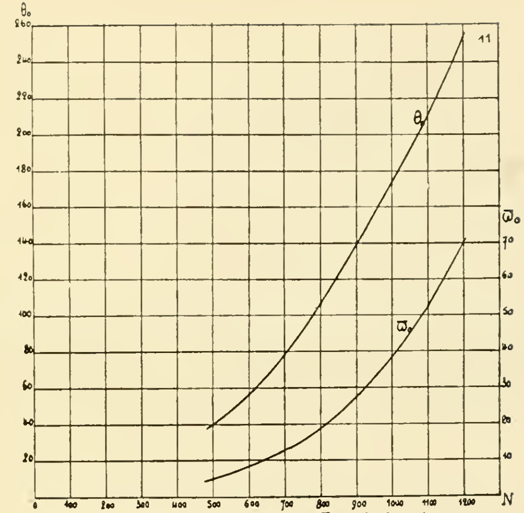
As before stated, no definite conclusion can be drawn as to the best profile of those tried, and it is hoped that some systematic tests will be made with that object in view.

If the reader will refer to AERONAUTICS for January, 1911, he will find an article in which I have plotted a curve giving the relation of thrust-ratio to slip, for the propellers tested by M. Raibouchinsky. The curve is similar to some of those here given.

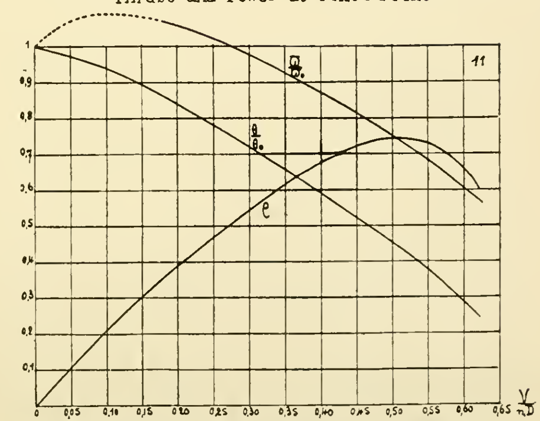
---

* Continued from the June 15th issue.





Thrust and Power at Fixed Point



Thrust, Power and Efficiency while Advancing

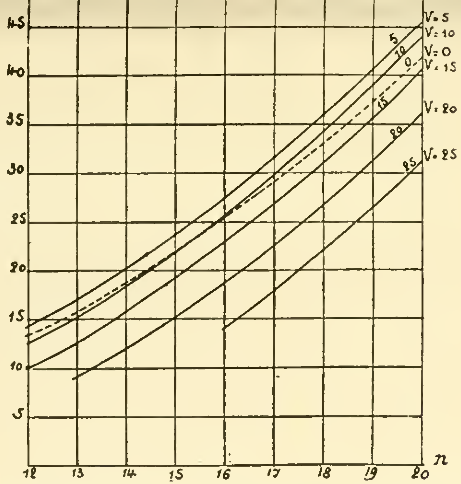
Table of Results at Fixed Point

N	n	Θ_0 en kgs	ϖ_0 en chevaux	P_0 en kgms par seconde	$\alpha = \frac{\Theta_0}{n^2D^4}$	$\beta = \frac{P_0}{n^3D^5}$	$\frac{\Theta_0}{\varpi_0}$	$\frac{\alpha}{\beta}$
480	8	37,2	4,4	330	0,0153	0,00681	8,45	2,25
540	9	46	6,05	454	150	660	7,60	2,27
600	10	56,4	8,3	623	149	660	6,79	2,26
660	11	68,5	10,9	817	150	650	6,28	2,30
720	12	82,6	13,5	1.011	152	621	6,10	2,44
780	13	100	17,2	1.290	156	624	5,81	2,50
840	14	119,2	22	1.650	161	638	5,41	2,52
900	15	139	27,4	2.050	163	644	5,09	2,52
960	16	160	34	2.550	165	661	4,80	2,50
1 020	17	180,3	41,2	3.090	165	664	4,38	2,49
1.080	18	202,5	49,6	3.725	165	676	4,08	2,44
1 140	19	226,5	59,2	4.450	166	688	3,82	2,41
1 200	20	254	70	5.250	168	695	3,63	2,41

$$q = \frac{\alpha^3}{\beta^2}\frac{4}{\pi\,.\,0{,}08} = \frac{\overline{0{,}0165}^3}{0{,}0068^2}\frac{4}{\pi\,.\,0{,}08} \doteq 1{,}55.$$

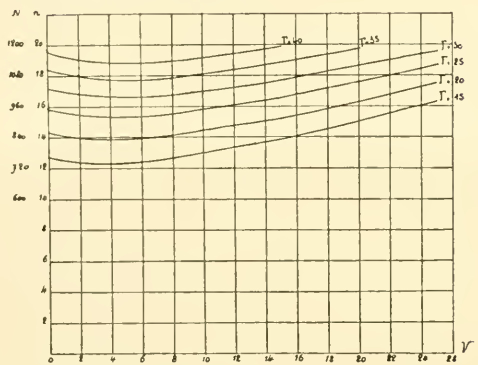
PITCH FOR THE 5 SECTIONS : $1^m,230 - 1^m,390 - 1^m,410 - 1^m,425 - 1^m,380$.

Fig. 5



TORQUE ON SHAFT OF PROPELLER NO. 11 PLOTTED ON NUMBER OF TURNS PER SEC. FOR DIFFERENT SPEEDS OF TRANSLATION.

Fig. 6



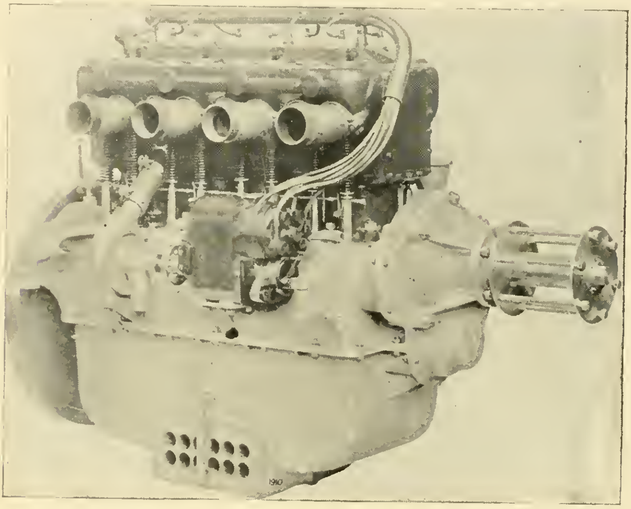
RELATION BETWEEN THE SPEED OF TRANSLATION AND THE SPEED OF ROTATION OF PROPELLER NO 11 FOR CONSTANT TORQUE

Fig. 7

n	20	19	18	17	16	15	14	13	12
N	1.200	1.140	1.080	1.020	960	900	840	780	720
$V = 0$									
ϖ_0 (ch.)	70	59,2	49,6	41,2	34	27,4	22	17,2	13,5
Γ_0 (kg × m)	41,9	37,3	33	29	25,5	21,75	18,85	15,8	13,45
$V = 5 \frac{m}{s}$									
$\frac{V}{nD}$	0,101	0,106	0,112	0,119	0,126	0,134	0,144	0,155	0,168
$\frac{\varpi}{\varpi_0}$	1,09	1,09	1,09	1,088	1,087	1,085	1,082	1,079	1,075
ϖ (ch.)	76,4	64,7	54,2	44,8	37	29,8	23,85	18,55	14,5
Γ (kg × m)	45,5	40,6	39	31,5	27,5	23,75	20,3	17,05	14,4
$V = 10 \frac{m}{s}$:									
$\frac{V}{nD}$	0,202	0,212	0,224	0,238	0,252	0,269	0,288	0,310	0,336
$\frac{\varpi}{\varpi_0}$	1,052	1,05	1,041	1,03	1,02	1,006	0,987	0,965	0,940
ϖ (ch.)	73,7	62,3	51,8	42,5	34,6	27,6	21,75	16,6	12,7
Γ (kg × m)	44	39,2	34,3	29,8	25,9	22	18,6	15,2	12,6
$V = 15 \frac{m}{s}$:									
$\frac{V}{nD}$	0,303	0,319	0,337	0,355	0,378	0,404	0,432	0,465	0,503
$\frac{\varpi}{\varpi_0}$	0,972	0,957	0,937	0,918	0,897	0,866	0,837	0,795	0,745
ϖ (ch.)	68,1	56,8	46,5	37,8	30,5	24,7	18,4	13,7	10,05
Γ (kg × m)	40,6	35,6	30,8	26,5	22,8	19,6	15,7	12,6	10
$V = 20 \frac{m}{s}$:									
$\frac{V}{nD}$	0,405	0,425	0,449	0,475	0,503	0,540	0,576	0,620	
$\frac{\varpi}{\varpi_0}$	0,864	0,842	0,812	0,782	0,745	0,700	0,642	0,572	
ϖ (ch.)	60,6	50	40,3	32,2	25,4	19,2	14,2	9,85	
Γ (kg × m)	36,2	31,4	26,7	22,6	18,9	15,3	12,1	9,05	
$V = 25 \frac{m}{s}$:									
$\frac{V}{nD}$	0,502	0,530	0,560	0,591	0,630				
$\frac{\varpi}{\varpi_0}$	0,745	0,710	0,670	0,620	0,553				
ϖ (ch.)	52,3	42	33,2	25,5	18,8				
Γ (kg × m)	31,2	26,4	22	17,9	14				

100-H.P. MODEL E—FOUR STURTEVANT MOTOR.

As announced last issue, the Sturtevant Company is confining itself to the 100 h.p. model. This new model is of the 4-cylinder, 4-cycle, water-cooled, vertical type; bore 4½ in., stroke 6 in., normal speed 1,800 r.p.m. The propeller shaft is driven through a reducing gear and turns 900 r.p.m.. The cylinders are of the T-head design, cast en bloc of semi-steel; water jackets cast integral with cylinders; two inlet and two exhaust valves provided in each cylinder. These are of large diameter and made of Rich's tungsten steel. They are mechanically operated by means of separate cams and push-rods direct from two cam shafts, and are easily removed for inspection or grinding without disturbing any other parts of the engine.



Pistons are of the same material as cylinders, extremely light, well ribbed for strength, and provided with three compression rings. Piston pin is chrome nickel steel, bored hollow, hardened and ground.

Connecting rods, "H" section, machined all over from forgings of the famous B. N. D. steel, and after being heat-treated have a tensile strength of 285,000 lbs. per sq. in. The big ends are fitted with interchangeable bushings of Parson's white brass, and the small ends are bushed with Phosphor bronze.

Crank shaft is chrome nickle steel, large diameter, machined all over, bored hollow throughout, supported on five bearings interchangeably bushed with Parson's white brass.

The base consists of two castings of a special aluminum alloy. The upper half of the base is designed with a view of strength and rigidity rather than extreme lightness. This contains the main bearings, and the Manganese bronze bearing caps are held in place by through bolts, which are also used to hold down the cylinders. The lower half of the base is of very light construction, and is designed for the purpose of containing the lubricating oil.

The two cam shafts are contained within the upper half of the base; large bronze bearings; steel gears; cams are integral with shaft.

Propeller shaft is carried on two large annular ball bearings and driven from the crank shaft by hardened chrome nickel-steel spur gears. These gears, as well as the half-time gears operating the cam shafts, are contained within an oil-tight casting integral with the base, and operated in a bath of oil. A large two-way, ball-thrust bearing is provided on the propeller shaft to take the thrust of a propeller or tractor screw, as the case may be.

Lubrication is of the complete forced system, a pressure of 50 lbs. being maintained on all bearings by rotary pump, submerged in the oil. All oil passages are cast integral with the base, no piping being used. The entire surface of the lower half of the base is covered with a fine mesh screen, through which the oil passes before reaching the pump. A tubular oil cooler, through which all the air entering the carburetor must pass, is submerged in the oil. Oil capacity, 5 hours.

Carburetor is Zenith type, bolted rigidly to the lower half of the base, and receives warm air from the oil cooler. Either a fuel pump or air pump can be supplied with the motor for the purpose of supplying fuel to the carburetor, if it is desired to place the tank below the level of the float chamber.

Bosch ignition, 2-spark, dual, with 2-spark plugs. Batteries may be used to facilitate starting.

Centrifugal pump delivers a large quantity of water into the water jacket on the exhaust valve side.

Every motor is first coupled to a dynamometer and required to show its rated horsepower, and later is subjected to a rigid test with a propeller, under the same conditions which it would operate in actual service.

The weight of this motor complete, with flywheel, carburetor, magneto, spark plugs, etc., but without radiator and propeller, is 420 pounds.

Several of these motors have already been sold, and among the parties who now have them in use are the Burgess Co. of Marblehead, Mass., and the Bay Cities Flying Boat Co., who have one in the aeroplane ferry operating between Oakland and San Francisco.

SHARP-DE VILLERS SUIT.

The case of Reese Sharp, of Or Nehr., against the Aeroplanes, M tors & Equipment Co., of 17 Broadway, New York, came on tl calendar for trial in the Municip Court, West 54th Street, on Ju 19th. A representative of the a torney for the Aeroplanes, Moto & Equipment Co. appeared and o fered an excuse for adjournmen The court refused to grant an a journment. Testimony was take and judgment was rendered in f vor of the plaintiff for $256.25 a costs.

INVESTIGATION OF AC CIDENTS.

Long urged by AERONAUTIC the Aero Club of America has no taken up the investigation of f talities and has issued the first tw reports of its "Public Safety an Accidents Investigation Committee, treating of the fatal accidents t H. P. Riche (H. P. Harris), a Akron, on May 3, and to Percy Va Ness, at Utica, May 8.

The conclusions are that Ricl strained the machine in his dow ward dive and sharp up-turn; th he failed to exercise proper care i making repairs made necessary b previous accident; that fastening of struts and wing beams were i secure.

In the Van Ness accident, th aviator had slight experience an took too ambitious a flight with previously untried machine; the fiel was too limited and a turn w necessary by topographical cond tions, in which the machine sid slipped, and dove, landing in th direction from which it came. Th machine was noticed to be tai heavy.

This is good work and is to l highly commended.

IMPORTS AND EXPORT FOR APRIL.

Imports, Foreign — Parts only $119; for 10 months ending Apri parts only, $26,359.

Exports, Domestic — Two aer planes, $6,500; parts, $6,646. Fo 10 months ending April—Aeroplane to total of $157,424; parts, $36,577

Exports, Foreign—None. For 1 months ending April, one plane an parts, $4,949.

No goods remaining in ware house.

NEW INCORPORATIONS

Great Falls Aviation Co., Grea Falls, Mont.; formed by C. B. an J. H. Prodger.

Terrell Aeroplane & Exhibitio Co., Inc., Utica, N. Y.; $5,000; T H. Murphy, F. E. Hanabray, C. A Terrell.

Pendhayn Aviation Co., Chicago $5,000; Emil Kahn, Joseph Pend hayn and Mamie Kahn.

Raygorodsky Aeroplane Co., 13 W. 36th St., New York; $125,000; M. I. Berg, B. B. Valentine, J. E. Haskell, A. Raygorodsky.

Scheusselburg's Aeroplane Cor poration, Dover, Del.; $50,000.

NILES LOOPS OVER NEW YORK.

On June 24 Charles S. Niles, who was second in the Aeronautical Society of America's race around Manhattan last Fall for the Times prizes, and who has been looping the loop and flying upside down in the Moisant monoplane, flew from the aviation field at Hempstead to Governors Island, over which he entertained army officers and aviation fans by making the most sensational flights yet made in his career, eye-witnesses declaring he outdid Lincoln Beachey in his loops, tail slides, turning over and upside down flying. Part of the time his evolutions were over the skyscrapers over lower Manhattan, where thousands watched in trepidation. To describe his feats would be like painting the rose. Readers can imagine the spectacle.

TRANSATLANTIC AEROPLANE FLYING.

The Wanamaker transatlantic flyer has been launched and is now being flown in trial flights at Hammondsport over Lake Keuka by Lieut. Porte, who will be the pilot in the attempt to cross the Atlantic some time in July if preparations can be made in time. The flight is anticipated to be made via the Azores, from Newfoundland, and a supply station has already been established by Lansing Callan at Ponta Delgada.

Various tests are being made at Hammondsport. The engines have been switched so that the two propellers rotate in opposite directions from the first direction. Weights are being carried to test the capacity. The pictures give a good idea of the craft.

The two 200-H. P. engines have been thoroughly tested on the block, as reported in the last issue of AERONAUTICS. These are equipped with Bosch magnetos, plugs, plug-hoods and cable. The pilot and mechanics are entirely protected from weather by the hood. The planking is diagonal at the bow, but wraps around a tubular fuselage. The approximate size of the boat may be seen from the second picture of the christening.

The fuel supply is arranged to be carried in six tanks, all located in the middle of the hull, directly under the centre of pressure. In one compartment, separated from the cabin occupied by the pilots, are three tanks, the largest of 150 gallons capacity, and beside it two tanks of fifty gallons each. In the corner of the cabin are two tanks of approximately twenty-five gallons capacity each.

All of these tanks will drain simultaneously into a smaller supply tank, from which the gasolene will be pumped to the motors. Emptied in this way the lessening of the load will not materially affect the machine's balance in the air. The tanks are fitted with splash boards and set on parts to prevent vibration affecting the connections.

Of the dual controls one side will have the standard Curtiss shoulder yoke, to which George Hallett is accustomed, while Lieut. John C. Porte will use the Deperdussin foot bar, with which he is familiar.

GLUE FOR WATERPROOFING.

In the description of the Boland flying boat, last issue, Jeffery's marine glue was mentioned. This is a glue especially designed for waterproofing airtight compartments, canvas over wooden hulls or pontoons, and for attaching canvas or other materials to wood, zinc and so forth. After being melted over a moderate fire, this glue is spread on the surface of the wood with a stiff brush. The canvas is then laid and gone over with an ordinary hot flat-iron; or, the canvas may be painted first and then laid on the wood. A thin layer of glue may also be brushed on over the canvas. This same glue is also made expressly for the purpose of use in combination with calico between the double planking of diagonally-built hulls. Full instructions may be had from the L. W. Ferdinand Co., 201 South St., Boston.

BALLOON RACERS MEET AWFUL EXPERIENCES.

Anxiety is felt for the safety of Roy Donaldson, of Springfield, Ill., and Wilbur Henderson, his aid, in the balloon "Springfield," one of the four contestants in the balloon race starting from Portland, Ore., June 11th.

The "Kansas City III," with John Watts, pilot, ascended from the circus grounds at 4:09 p. m. Thursday, June 11th. The others started at 10-minute intervals in the following order: "Uncle Sam," Capt. Honeywell, pilot; "Springfield," Roy Donaldson, pilot, and the "Million Population Club," piloted by John Berry of St. Louis.

Soon after dark the balloons encountered a terrific wind, thunder and lightning storm. The "Uncle Sam" was forced to land a few hours after the start near Beaver Creek, about 18 miles from Portland. Friday afternoon one of the carrier pigeons, carried by three of the balloonists, brought word that Berry's balloon had been struck by lightning and that Berry had been injured. The message did not give the location. The "Million Population Club" was found later, however, near Clarkes, 27 miles from Portland. Berry was not injured seriously.

The "Kansas City III," with John Watts and Roscoe Fawcett, aid, landed safely in Marion County, nine miles from Cascadia, at 9:20 Friday morning, having covered the greatest distance, some 75-80 miles, with the balloon "Springfield" still to be heard from.

The missing balloon was sighted over the Sandy River district early Friday morning. It took Watts and his companion 24 hours to get out of the wilderness and to a ranch. A bi-weekly stage is the only means of communication between the ranch and civilization. The Watts balloon was almost destroyed in landing in the trees.

Berry reports his balloon exploded by lightning, and it parachuted into the treetops, after coming, snow-covered, from an altitude of 12,000 feet.

ELEVEN ENTER BALLOON RACE.

St. Louis, June 4.—Eleven entries for the elimination balloon race here on July 11 were announced to-day by the St. Louis Aero Club. The list, the largest ever recorded for the national race, follows:

Roy S. Donaldson, Springfield, Ill.; Jerome Kingsbury, New York City; R. A. D. Preston, Akron, O.; Arthur Atherholt, Philadelphia; H. E. Honeywell, E. S. Coles, William S. Assmann, Paul J. McCullough and Capt. John Berry, St. Louis; Warren Rasor, Brookville, O.; John Watts, Kansas City, Mo.

BALLOON ASCENSIONS.

Akron, O., May 18—R. A. D. Preston, R. H. Upson and Passenger, in the "Goodyear," to Navarre; duration, 5 hours; altitude, 8,700 ft.

AT JOHNSON'S SCHOOL.

The Walter E. Johnson School of Aviation opened Decoration Day with a nnmber of good flights by W. E. Johnson and W. H. Minnerly. A few passengers were carried, and the new students were given their first rides.

Among the most promising of the students is Arthur Redpath, formerly mechanician for Chas. Herrmann and Walter Johnson, who, from his long familiarity with aeroplanes, only needed the experience in the air.

Two young ladies are expected to join the class the early part of next week, to learn to handle their own flying boats this season.

Matt Tooey, the well-known Conesus Lake sportsman, is progressing rapidly in the art of passenger carrying, having done quite a large ferry business last Sunday from McPhersons Point to Long Point and return.

The machines are housed within a hundred feet of the Livingston Inn, a well-known summer resort, where first-class accommodations can be had by aviation students at special rates.

Two large hangars will be built in a short time, as construction is well under way at the present writing.

Walter Johnson has been flying the past two weeks at Greenwich, Conn., with his flying boat.

MASS. TECH. ANNOUNCES COURSE IN AERODYNAMICS.

Outlines of the course in aeronautical engineering have just been issued by the Massachusetts Institute of Technology, the first of the kind in the country. The Institute offers a graduate course leading to the degree of Master of Science, which is open to graduates of the Institute in mechanical engineering, electrical engineering and naval architecture, and to graduates of other colleges whose preparation is equivalent to the work required for the bachelor's degree in one of these courses.

The course is intended to furnish training in the design and construction of air-craft, dirigibles, aeroplanes and hydro-aeroplanes. Attempt will be made to train men who are already engineers to undertake the experimental development of air craft, their manufacture, repair and maintenance.

The students will be required to design and prepare working drawings, and to aid them a complete information file has been collected and plans and descriptive material are available for the principal European and American air craft. A special aeronautical library of 400 volumes, together with the leading periodicals, will be for the use of the students.

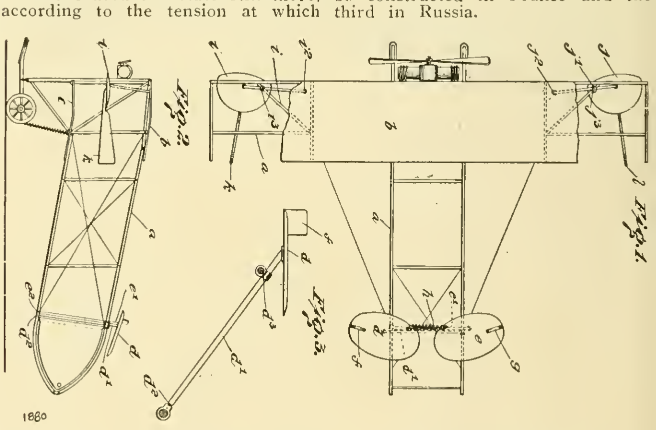
The experimental laws of aerodynamics will be studied in the new laboratory in such manner as to develop in the student an appreciation of their importance in design of air craft, and the ability to make use of the published results of experiments conducted in other laboratories. The aerodynamical laboratory, on the new site, has already been described (AERONAUTICS, March 31).

The courses will be under the general direction of Prof. Cecil H. Peabody, head of the department of Naval Architecture and Marine Engineering, and will be conducted by Assistant Naval Constructor Jerome C. Hunsaker, U. S. N., who is detailed for the service by the Secretary of the Navy. Courses in dynamics of rigid bodies and theoretical fluid dynamics will be given by Prof. E. B. Wilson, Ph.D., professor of mathematics; in explosion motors, by Joseph C. Riley, S.B., associate professor of heat engineering; while special lecturers will deliver courses in wireless telegraphy and meteorology. Donald W. Douglas, S.B., is assistant in the laboratory.

WINDEL AUTOMATIC STABILIZER.

Theodore Windel has patented, through F. W. Barker, the patent attorney, an automatic system for longitudinal as well as lateral stability.

"Using the device as an elevator, two planes are arranged at rear of fuselage to rotate free around their own central axes, each of which is in an inclined position and both at equal opposite angles, connected at front by a spring regulated to a certain tension equal to a certain pressure on a small vertical lateral surface, one on each of said planes. In starting an aeroplane from the ground, the pressure on vertical (lateral) planes ("gf") will slowly equalize the pull of spring at front side of plates ("de"), causing them to rotate around their axes, at same time lowering the tail of aeroplane and diminishing the angle of incidence. At more speed these planes will be caused to rotate still more, according to the tension at which



spring is set to equalize with the pressure exerted on vanes ("gf"). Should the speed of aeroplane decrease, the pressure on vanes correspondingly diminishes, the tension of spring rotates planes ("de") till they again equalize with the pull of springs against pressure of vertical vanes ("gf"), according to predetermined speed of machine in a horizontal position. If the engine should accidentally stop, this device would, it is claimed, raise the tail and bring the whole aeroplane to its gliding angle, keeping machine at its predetermined speed at all times. If the speed, through gusts or other causes, should increase, reverse action will take place, compelling the whole machine to level up or even raise, till its momentum or speed diminishes.

"For lateral automatic balance, two independent auxiliary planes ("ij"), with fins or vanes ("lk") attached vertically to rear of each plane, are fixed rigid, each on an axis running through center of same at equal opposite angles, one of said planes attached on each extreme side of aeroplane, and each of said planes to rotate free in its whole around its own axis, according to pressure exerted on vertical fins ("lk").

"If aeroplane is out of balance, it will skid a certain amount, according to actual speed, lateral angle or rudder operation, towards its lower side, but as planes are free to swing and the skidding action produces a certain pressure on fins, it compels same to rotate and by so doing changes their respective angles of incidence, bringing lower side back to normal level or by rudder operation banking machine."

AEROPLANE ORDERS BY RUSSIAN GOVERNMENT.

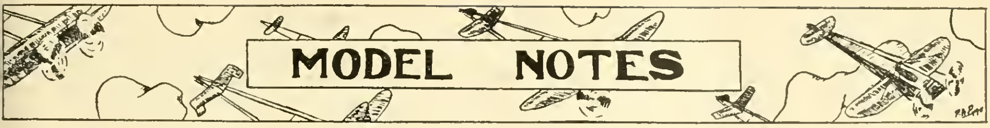
The War Department has completed its program for aerial craft, covering this year. According to the Russian press it is proposed to order 326 ordinary aeroplanes and 10 aeroplanes of the type of the Sikorsky "Ilya Murometz." Of the 326, 100 will be of the type of Sikorsky, of moderate dimensions. The others will represent the types of Farman, Duperdussin, Morane, and Voisin. The proposed program will be completed before the autumn of 1914. The War Department has already ordered three large dirigibles, of which two will be constructed in France and the third in Russia.

IN AIR 18 HOURS.

Berlin, June 24.—Gustav Basser, a German aviator, made a new world's record for duration of an aeroplane flight without passengers at Johannisthal to-day by remaining in the air 18 hours and 10 minutes. The previous mark was 14 hours and 7 minutes, set by Bruno Langer, also a German, on February 3 last.

MAKES NEW ALTITUDE RECORD.

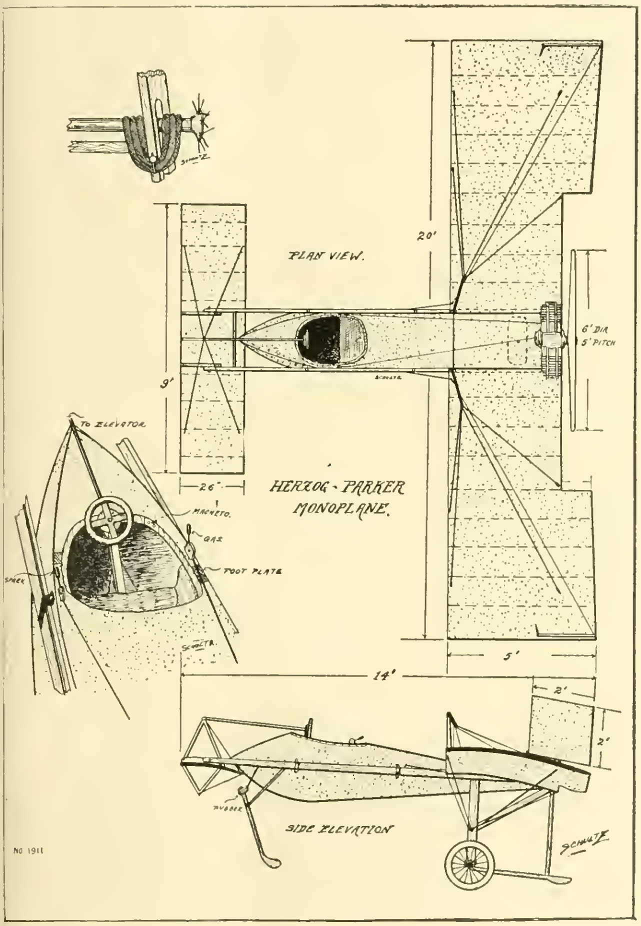
Independence, Cal., June 25.—Silas Christofferson, aviator, in a biplane flew to-day over the peak of Mount Whitney, 14,898 feet high. He attained an altitude estimated at more than 16,000 feet and established, it is contended, a new American altitude record.



HARRY SCHULTZ, Model Editor

THE HERZOG-PARKER MONOPLANE

The Monoplane shown in the accompanying drawing was designed and built by Harry Herzog and Cortland S. Parker of Brooklyn, N. Y. Both of these young men have experimented with models and gliders for some years and have at last turned their attention to full-sized machines.



This diminutive machine is of high-class construction and finish, and according to the statements of the designers, ought to prove an excellent flyer. The span of the main planes is only 20 feet, the overall length approximately 14 feet, and the complete weight, with pilot and full tanks, approximately 400 pounds.

The body of the machine is of streamline form, built up and covered with fabric, and, as shown by the detail sketch, has a very neatly upholstered cockpit and seat. Extending along the sides of the body, and secured thereto by steel plates, are spruce outriggers which support the elevator.

The main planes have a dihedral angle of 17 inches and are supported above by stranded steel cables running to two uprights, secured to the fuselage at the entering edge of the main plane, and below by cables running to beams forming part of the chassis. At the outer ends of the main plane are rudders two feet square, which act on the principle of the Boland device, steering and balancing the machine. These rudders are operated by the turning of a hand wheel and the elevator is controlled also by pulling backward and pushing forward on the hand wheel.

The chassis consists of an elastically sprung skid at the front of the fuselage and two elastically sprung wheels at the rear, together with a rearwardly extending skid to protect the propeller.

A Detroit Aero Motor has been used on this machine, but owing to its age and for other reasons has not been giving its usual amount of power, which has been a great handicap to the testing out of the machine. However, the builders expect to install a new motor shortly.

THE FENOUILLET GLIDER.

The subject of the scale drawing shown is the Fenouillet biplane glider, constructed and flown by Louis A. Fenouillet, Jr., of Brooklyn, member of the Aeronautical Society of America and the Aero Science Club.

The glider, which was one of the aeronautical exhibits at the Spring Festival and Ball held at the Seventy-first Regiment Armory in April, has proven to be a very steady flyer, as scores of hand-towed flights have been made at Governor's Island and other places, ranging in distances of 100 to 3,000 feet at altitudes of 20 to 100 feet.

The design of the glider is somewhat on the standard biplane type, but some novel features are employed in the construction, namely, the beams of the main planes, tail planes, rudder outriggers, vertical rudder uprights and arm pieces are of ash, as most strain is upon these members, while the laminated ribs, streamline uprights, and struts, are of spruce, and clamps, hinges, and rudder sockets being sheet iron, while the upright sockets are of aluminum, and eyebolts for clamping the upright sockets and all other stove bolts employed are 3/16-inch round.

The ribs of the main planes are of two laminations, with a 2½-inch camber, one-third back from the entering edge, and are bound to the main beams with a strong linen thread, and then glued with Ambroid, while the main plane uprights are stream-line, tapering from ⅞ inch round at the ends to 1½ inch in the centre.

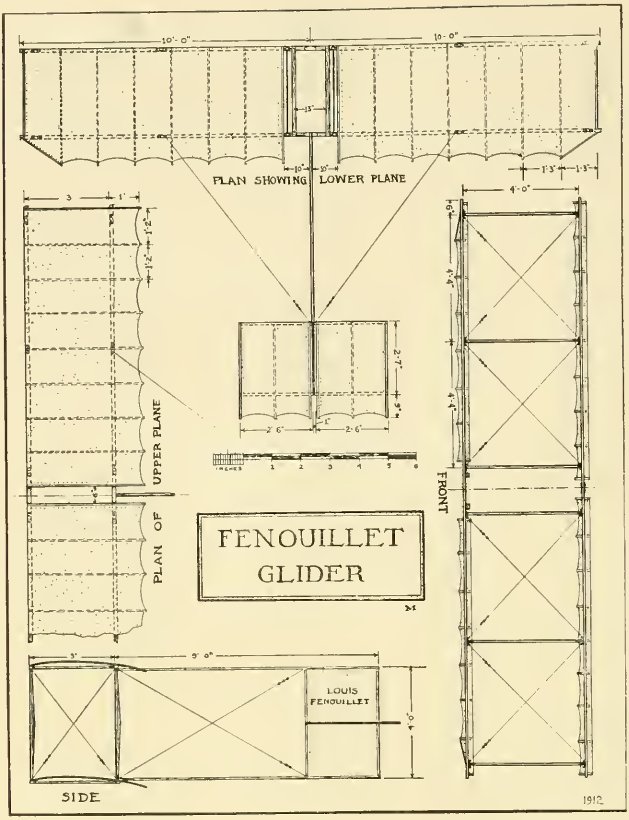
Another feature of the construction are the hinged tail planes (the ribs of which are straight) to make assembling and dismantling quicker.

The covering, which is laced to the planes, is a cheap unbleached muslin treated with a "dope," consisting of a coat of thin, hot glue, applied on each side and then shellacked.

The principal dimensions of the glider are: Span, 20 ft.; chord, 4 ft.; length, 9 ft.; span of tail, 5 ft.; width, 3 ft. 4 in.; rudder, 2 ft. 7 in. by 3 feet. 10 in.; gap between planes, 4 ft., and the weight 55 lbs.

Frenchman Finds Safety in Aviation.

Another parachute pack. Somehow or other nothing is done in aviation save in France.



29 West 39th Street, New York

OFFICIAL BULLETIN.

New Members.

Elias E. Ries, 116 Nassau St New York.

Gail Ison, 510 Mill St., Raymon Wash.

Directors Meetings—

Directors' meetings are being hel every Thursday evening throughou the summer, as usual. Regul weekly members' meetings are hel as usual. The monthly lectures hav been suspended for the summer se son.

Data Sheets.

The second series of data shee has been sent out to members, co sisting of nearly a hundred sheets.

Annual Derby—

Plans are in progress for the pe petuation of the race around Ne York as inaugurated last Fall, ma ing it an annual event on a p with the great classics of the spo ing world.

Meetings are held every Saturd evening at the Aeronautical Societ 29 West Thirty-ninth street, Ne York City. This club controls t model flying in this country throu its branches, and all records of of cial flights must be certified by it.

E. H. Jaquith is operating a Cu tiss flying boat at Atlantic City, d ing a good business in carrying pa sengers at $15 a flight.

Tony Jannus is creating splend interest and doing good work in ca rying passengers at Sandusky, whe he has established himself, as a nounced last issue. Jannus devot himself exclusively to water flyin and is open for engagements an where for passenger or exhibitio work.

Aero Science Club of America Bulletin.

A model propeller testing machine has been donated by the Aeronautical Bureau for making relative thrust tests of model propellers and tractors. A vote of thanks has been extended to the Aeronautical Bureau for this donation.

At the meeting of June 13 Messrs. L. & H. Blomquist visited the club and gave a very excellent demonstration of their "Synchronous oscillators," which were tested in many ways, and clearly demonstrated their practicability. Mr. George Bauer, one of the members of the club, will co-operate with Messrs. Blomquist in constructing a model having oscillators as a substitute for planes and propellers.

It has been decided to hold a contest for flying boats at Prospect Park Lake, Brooklyn, on July 12, 1 to 4 p. m.

INDEX TO VOLUME XIV.

NOTE.—Volume I started with the first issue, that of July, 1907; Volume II started with the issue of January, 1908; Volume III, with the July, 1908, issue; Volume IV, with the January, 1909, number; Volume V, with the July, 1909, number; Volume VI, with the January, 1910, issue; Volume VII, with the July, 1910, issue; Volume VIII, with the January, 1911, number; Volume IX, with the July, 1911, issue; Volume X, with January, 1912; Volume XI, with July, 1912; Volume XII, with January, 1913; Volume XIII, with July, 1913, and Volume XIV, with January 15, 1914.

Only principal articles are indexed. News notes in general and smaller mentions are not indexed.

Pages 1- 16—No. 1, January 15, 1914.
" 17- 32—No. 2, January 31, 1914.
" 33- 48—No. 3, February 14, 1914.
" 49- 64—No. 4, February 28, 1914.
" 65- 80—No. 5, March 15, 1914.
" 81- 96—No. 6, March 31, 1914.
" 97-112—No. 7, April 15, 1914.
" 113-128—No. 8, April 30, 1914.
" 129-144—No. 9, May 15, 1914.
" 145-160—No. 10, May 30, 1914.
" 161-176—No. 11, June 15, 1914.
" 177-192—No. 12, June 30, 1914.

AERONAUTICS

Combined with "FLY"

'ublished semi-monthly in the best interests of Aeronautics

BY

AERONAUTICS PRESS INC.
250 West 54th Street
New York
Telephone, Columbus 8721
Cable, Aeronautics, New York

RNEST L. JONES	Editor
I. B. SELLERS,	Technical Editor
IARRY SCHULTZ,	Model Editor
. A. BEIER,	Advertising

:ntered as Second Class Mail Matter, September 22, 908, under the Act of March 3, 1879. $3.00 a year, 5 cents a Copy.

'ostage free in the United States, Hawaii, the Philipines and Porto Rico. 25 Cents extra for Canada nd Mexico. 50 Cents extra for all other countries.

he magazine is issued on the 15th and 30th of each ıonth. All copy must be received 6 days before ate of publication. If proof is to be shown, allownce must be made for receipt and return.

Iake all checks and money orders free of exchange nd payable to AERONAUTICS PRESS.

ubscribers will kindly notify this office if disconnuance is desired at the end of their subscription eriod, otherwise it will be assumed that their sub-ription is to be continued.

ON HYDROPLANE HULLS.

To the Editor:—

Your article in the May number describing the experiments with models of hydroplane hulls carried on by Naval Constructor H. C. Richardson, is as timely as it is interesting to all who are concerned with the developments of air and water machines.

It has been the privilege and opportunity of the writer to have some knowledge of Naval Constructor Richardson's experiments during their progress, and it is gratifying indeed that the results of this valuable work are to be available to the general public.

In the last part of your article in the May number of Aeronautics there appears to be some confusion in the figures referring to the different model forms. Model 1591-1, shown in the photograph Plate A, Figure 2, was a true V-type, as stated and substantially identical with 1602-1, shown in Figures 2 and 3. Through the very great courtesy of Mr. Richardson, the writer was permitted to witness the experiments from which the photograph Figure 2 was taken. This model was considered satisfactory in every way except as to the sheet of water thrown.

It was the privilege of the writer to propose to Mr. Richardson and his assistants that the true V-form, 1602-1, should be modified by making the V-sections as shown by model 1617-2. The idea expressed by the writer in proposing this change was that the energy which the true V-model absorbed in hoisting the sheets of water on either side could be saved by so curving the sides of the bow as to throw the sheets of water downwardly to get an upward reaction by the reversal of the flow —this on the well-known principle of reaction turbines in which the flow of the impelling fluid is reversed to obtain the greatest reaction. The writer's suggestion was very cordially received, Mr. Richardson promising to try the idea out at once and report results. During the following week the full bow model, 1591-3, was tried and also 1617-2, as proposed by the writer. The very gratifying results in connection with the hollow V-section were very kindly reported by letter from Mr. Richardson to the writer as soon as the experiments were carried out. In a very kind letter, Mr. Richardson acknowledged the writer's suggestion of the hollow V-form and reported the remarkably superior results indicated by this model.

During the time that the model experiments with the hollow V-form were being carried on, the writer designed and began construction of a twenty-foot hydroplane hull embodying the same idea This hydroplane was in process of building when Mr. Richardson's report was received. It has since been completed and a 40-h.p. aeronautical engine obtained for driving it with air propeller, but owing to pressure of other matters the engine has not yet been installed.

From the model experiments carried out and the practical results that have since been obtained by the Curtiss Company and the Burgess Company under the direction of the navy, with full sized machines, there can be little doubt that the hollow V-bow is to be a feature of very many of the most successful machines from now forward.

It is from the strongest conviction of the value of this form of bow that the present letter is being written to your magazine with the view of setting out clearly for the benefit of the many constructors who will be interested, the precise type of hull which shows the most gratifying behavior in every way. The matter is well summed up in paragraph "b" of Constructor Richardson's conclusions:

"Hollow V sections keep the spray down, cut the water more easily and cleanly, plane better and greatly reduce shock on landing or when plowing through broken water, and practically eliminate the necessity of shock absorbers."

Very truly yours,
SPENCER HEATH.

LOENING ENTERS RUSSIAN NAVAL CONTEST

Grover C. Loening, who con cludes his work with the Wrigl Company in July, will take up fl ing boat work in the vicinity of New York. He has entered th competition for the design of hydr planes to be held by the Imperi Russian Navy, for which $3,200 hav been offered in three prizes. Th designs entered must be forwarde by August 14th to the Committe for the Hydroaeroplane Competitio Naval General Staff, Admiralty, S Petersburg. The requirements ca for machines far in advance in pov er, size and efficiency of any no known to be in use.

The machines desired must hav not less than two motors; it mus be capable of carrying for 630 mile at 63 m. p. h. two pilots, two ol servers and a mechanic, weighin not less than 770 lbs.; full pr visions of oil, fuel and water fo the complete flight, and an add tional weight of 330 pounds; m tors accessible for inspection, adjus ment, repair, and replacement c parts during flight; motors capabl of starting by pilot; pilots must b able to relieve each other durin flight; horizontal flight possible wit two-thirds the maximum moto horsepower available in flight. Pr vision must be made for a clea field of vision for the two observ ers, space for mounting machin gun, a wireless installation, a search light, and a bomb-dropping apparatus.

The machines are required to b thoroughly seaworthy and so a ranged that they will be reasonabl stable when afloat with all motor stopped, and that the propeller shall not come in contact with th water.

Further details regarding condi tions and rules of design competi tion may be seen at the office o Aeronautics.

I think you have one of the bes magazines in the world, and woul not do without it for double th present price.

W. E. L., Ft. Worth, Tex.

PATENTS
SECURED or FEE RETURNED

Send sketch or model for FREE search of Patent Office record. Write for our **Guide Books** and **What to Invent** with valuable **List of Inventions Wanted** sent Free. Send for our special list of prizes offered for Aeroplanes. ***$600,000 Offered in Prizes for Airships.*** We are Experts in **Aeronautics** and have a special **Aeronautical Department.** Copies of Patents in Airships, 10 cents each.

VICTOR J. EVANS & COMPANY Main Offices: 724-726 NINTH STREET, N. W. WASHINGTON, D. C.

PATENTS

C. L. PARKER
Ex-member Examining Corps, U. S. Patent Office
Attorney-at-Law and Solicitor of Patents

American and foreign patents secured promptly and with special regard to the complete legal protection of the invention. Handbook for inventors sent upon request.

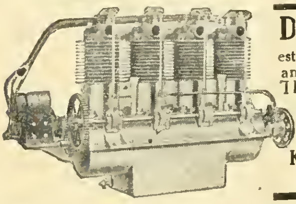
30 McGill Bldg. **WASHINGTON, D. C.**

FLYING

By HAMEL and TURNER
Large 8vo., cloth, 338 pp.
$3.50 postpaid

The one best practical non-technical book of the year. Recommended to pilots, students, amateurs, prospective purchasers and the casually interested.

AERONAUTICS - 250 W. 54th St., New York



DON'T write us unless you are interested in a reliable, efficient and economical power plant. That is the only kind we build. Four sizes.
Reasonable Prices

Kemp Machine Works
Muncie, Ind.

PATENTS

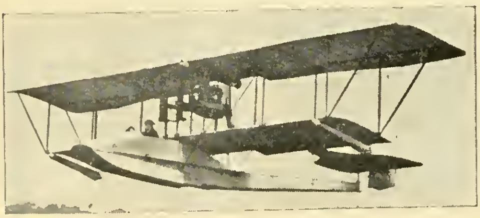
THAT PROTECT AND PAY
BOOKS, ADVICE AND SEARCHES **FREE**
Send sketch or model for search. Highest References
Best Results. Promptness Assured.

WATSON E. COLEMAN, Patent Lawyer
624 F Street, N. W. Washington, D. C.

The
SLOANE SCHOOL OF AVIATION
Superior Training
MONOPLANES and FLYING-BOATS
Address
Sloane Aeroplane Co.
1733 Broadway *New York*

INVENTORS' MODELS
Constructed of any material
Estimates made from drawings. Low prices.

H. C. BROWN, *Machinist*
54 PARK AVENUE -:- BROOKLYN, N. Y.



The ... Thomas School
OF AVIATION
OFFERS SUPERIOR ADVANTAGES
Address, **Thomas Bros. Aeroplane Co.**
BATH, N. Y.

The
Wright
Company

(The
Wright
Patents)

WIRE

We make an extra high grade plated finish wire for aviators' use.

FOR FURTHER INFORMATION ADDRESS

John A. Roebling's Sons Co.
TRENTON, N. J.

V.G.,

THE NEW WRIGHT AEROPLANES

For sport, exhibition or military use, over land or water now embody the improvements that have been suggested by the experiments quietly conducted during the past ten years.

The Wright Company
DAYTON, OHIO New York Office: 11 Pine St.